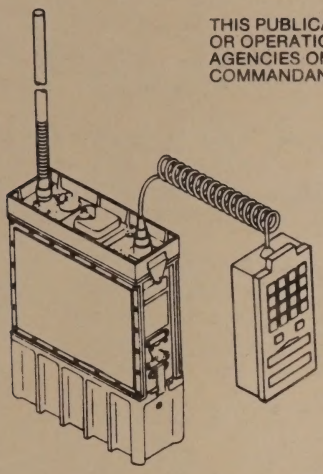
ARMY TM 11-5825-269-20
MARINE CORPS TM 08848A-20/1

ORGANIZATIONAL MAINTENANCE MANUAL



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MANPACK RADIO SET AN/PSQ-4
(NSN - - -)
VEHICLE RADIO SET AN/VSQ-1
(NSN - - -)
GROUND RADIO SET AN/GRC-210
(NSN - - -)
AIRBORNE RADIO SET AN/ASQ-177(V)1
(NSN - - -)
AIRBORNE RADIO SET AN/ASQ-177(V)2
(NSN - - -)
USED WITH POSITION LOCATION REPORTING SYSTEM AN/USQ-90

HEADQUARTERS, DEPARTMENT OF THE ARMY
HEADQUARTERS, US MARINE CORPS

4 JULY 1986 **PCN 184 088490 00**

WARNING

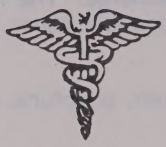
Lithium organic batteries or cells are used in the manpack unit and AGU battery boxes. They are potentially hazardous if misused or tampered with before, during, or after discharge. The following precautions must be strictly observed to prevent possible injury to personnel or equipment damage:

DO NOT heat, incinerate, crush, puncture, disassemble, or otherwise mutilate the batteries.

DO NOT short-circuit or recharge batteries or bypass internal fuse.

DO NOT store batteries in equipment during period of non-use in excess of 30 days.

TURN OFF the equipment immediately if you detect battery compartment becoming unduly hot, hear battery cell venting (hissing sound), or smell irritating sulphur dioxide gas. Remove and dispose of battery only after it is cool (30-60 minutes).



5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
2. IF POSSIBLE , TURN OFF THE ELECTRICAL POWER
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL
4. SEND FOR HELP AS SOON AS POSSIBLE
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

Technical Manual
NO. 11-5825-269-20
NO. 08848A-20/1

HEADQUARTERS DEPARTMENT OF THE ARMY
HEADQUARTERS US MARINE CORPS
Washington, DC, 3 September 1985

Organizational Maintenance Manual
MANPACK RADIO SET AN/PSQ-4
(NSN - - -)
VEHICLE RADIO SET AN/VSQ-1
(NSN - - -)
GROUND RADIO SET AN/GRC-210
(NSN - - -)
AIRBORNE RADIO SET AN/ASQ-177(V)1
(NSN - - -)
AIRBORNE RADIO SET AN/ASQ-177(V)2
(NSN - - -)
Used With Position Location Reporting System AN/USQ-90

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007.

Marine Corps personnel, submit NAVMC 10772 (Recommended Changes to Technical Publications) to Commanding General, Marine Corps Logistics Base, Code 850, Albany, Georgia 31704-5000.

In either case, a reply will be furnished direct to you.

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HOW TO USE THIS MANUAL

CONTENT OF MANUALS

This manual is one of a set of manuals for the user units (radio sets) used with Master Station AN/TSQ-129 or Truck Mounted Master Station AN/MSQ 119 which are part of Position Location Reporting System AN/USQ-90. The complete set of user unit manuals consists of the following:

- TM 11-5825-269-10/ TM 08848A-10/2 — Operator's Manual, Manpack Radio Set AN/PSQ-4, Vehicle Radio Set, AN/VSQ-1, Ground Radio Set AN/GRC-210 Used with Position Location Reporting System AN/USQ-90.

- TM 11-5825-269-10-1/ TM 08848A-10/1-1 — User Unit Field User's Handbook

- TM 11-5825-269-20/ TM 08848A-20/1 — Organizational Maintenance Manual, Manpack Radio Set AN/PSQ-4, Vehicle Radio Set AN/VSQ-1, Ground Radio Set AN/GRC-210, Airborne Radio Set AN/ASQ-177(V)1, Airborne Radio Set AN/ASQ-177(V)2 Used With Position Location Reporting System AN/USQ-90.

- TM 11-5825-269-20P/ TM 08848A-20P/1 — Organizational Maintenance Repair Parts and Special Tools List (RPSTL), Manpack Radio Set AN/PSQ-4, Vehicle Radio Set AN/VSQ-1, Ground Radio Set AN/GRC-210, Airborne Radio Set AN/ASQ-177(V)1, Airborne Radio Set AN/ASQ-177(V)2, Used with Position Location Reporting System AN/USQ-90.

HOW TO USE THIS MANUAL (cont)

CONTENT OF MANUALS (cont)

This manual contains all of the information that you require to maintain the user units. This manual is divided into two chapters:

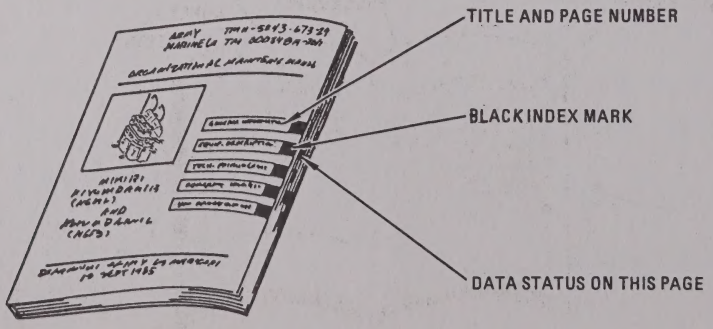
- Chapter 1; Introduction, contains an introduction to the manual and describes the user units.
- Chapter 2, Organizational Maintenance Instruction, is divided into five sections as follows:

Section I, Repair Parts, Special Tools, TMDE, and Support Equipment
This section refers to the TMDE and to the RPSTL.
Section II, Service Upon Receipt
This section contains the general information for installation of the surface vehicle unit.
Section III, Troubleshooting
This section contains test and fault isolation procedures for all versions of the user units.
Section IV, Maintenance Procedures
This section contains procedures for removing and installing major assemblies of the user units.
Section V, Preparation for Storage or Shipment
This section contains requirements for administrative storage and for preparation for shipment of user units.

HOW TO ACCESS INFORMATION QUICKLY

Pages are numbered consecutively within each chapter. Each page number is prefixed with the chapter number. For example, page 3 of chapter 2 is numbered 2-3. All references are made by page number.

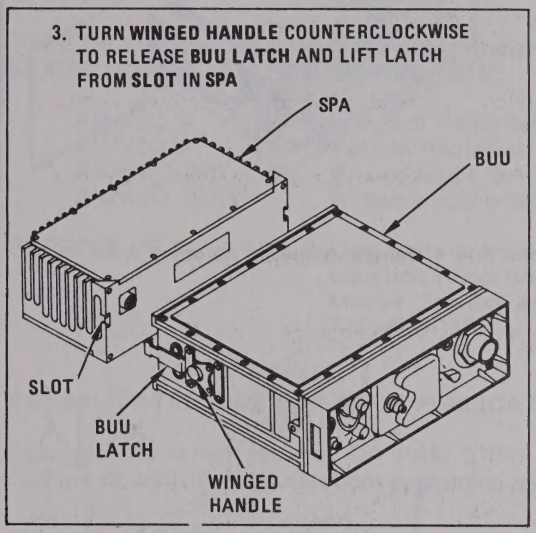
Each chapter is divided into sections. The chapter and section titles appear in the table of contents along with the starting page number for each. Each chapter contains a section index and each section contains an index of the information in that section. An index of most used information is contained on the front cover of the manual. The title of the information is contained in a box that also contains the page number. At the right edge of each box is a blacked-in area. This blacked-in area corresponds to a blacked-in area on the first page of the indexed information. See illustration below.



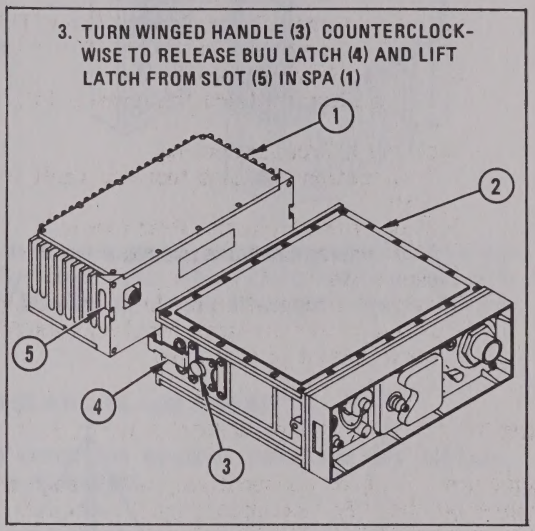
HOW TO USE THIS MANUAL (cont)

HOW TO USE PROCEDURES

Where procedures require supporting illustrations, the illustrations are on the same page as the text or on the facing page. When the text refers to an item on an illustration, the reference is made by the item name or by a key number. Generally, items are called out by name but on illustration containing many callouts, key numbers are used instead to prevent cluttering the illustration with names. Below are two examples; one using item names and the other using key numbers.

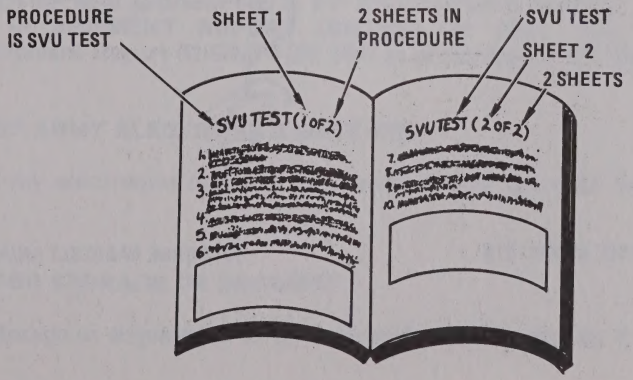


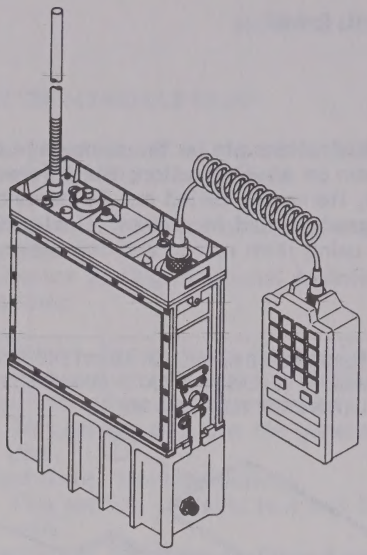
EXAMPLE USING ITEM NAMES



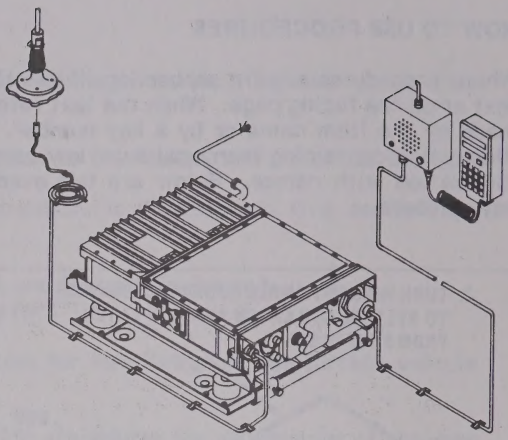
EXAMPLE USING KEY NUMBERS

When procedures require more than one page, each page carries the same title in a block at the top of the page. Along with the title, the block contains the sheet number and the total number of sheets in the procedure. See example below.

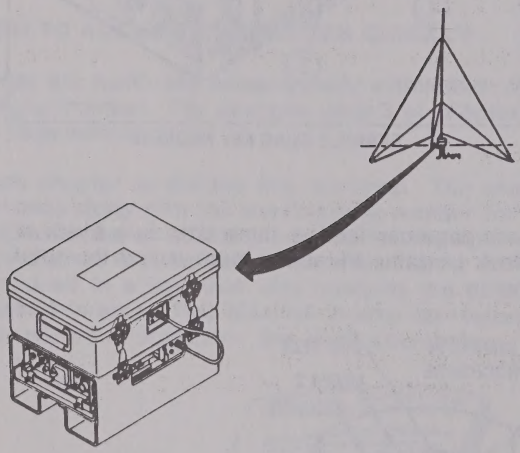




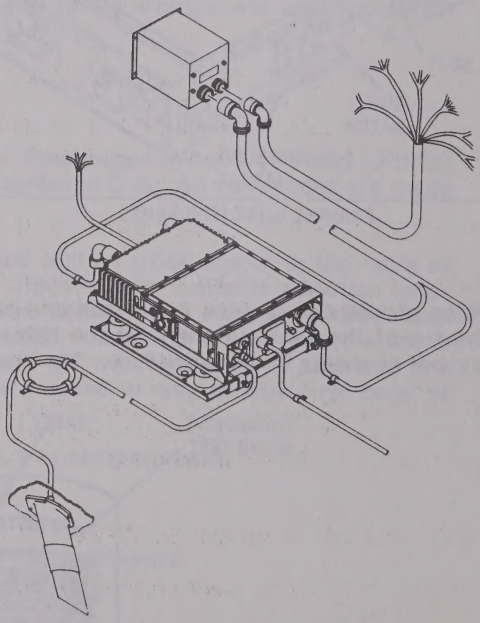
MANPACK RADIO SET AN/PSQ-4



VEHICLE RADIO SET AN/VSQ-1



GROUND RADIO SET AN/GRC-210



AIRBORNE RADIO SET AN/ASQ-177(V)

CHAPTER 1
INTRODUCTION

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Section I. GENERAL INFORMATION

SCOPE

TYPE OF MANUAL: Organizational Maintenance
MODEL NUMBER AND EQUIPMENT NAME:

AN/PSQ-4	Manpack Radio Set
AN/VSQ-1	Vehicle Radio Set
AN/GRC-210	Ground Radio Set
AN/ASQ-177(V)	Airborne Radio Set

PURPOSE OF EQUIPMENT: User units are used to provide position location data for Position Location Reporting System (PLRS) AN/USQ-90 and are used with Master Station AN/TSQ-129 or Truck Mounted Master Station AN/MSQ-119.

CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA PAM 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

MAINTENANCE FORMS, RECORDS, AND REPORTS

REPORTS OF MAINTENANCE AND UNSATISFACTORY EQUIPMENT. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750 as contained in Maintenance Management Update. Marine Corps personnel refer to TM 4700-15/1 for equipment record procedures.
REPORT OF PACKAGING AND HANDLING DEFICIENCIES. Fill out and forward a Report of Discrepancy (ROD) (SF 364) as prescribed in AR 735-11-2/MCO 4430.3F.
DISCREPANCY IN SHIPMENT REPORT (DISREP) (SF 361). Fill out and forward a Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/MCO P4610.19D.

DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

PREPARATION FOR STORAGE OR SHIPMENT

Preparation for storage or shipment shall be in accordance with section V of chapter 2.

NOMENCLATURE CROSS-REFERENCE LIST

Common Name	Official Nomenclature
Manpack Unit (MPU)	Manpack Radio Set AN/PSQ-4
Manpack Battery Case	Battery Case CY-7871/PSQ-4
Manpack Antenna	Antenna AS-3448/PSQ-4
Surface Vehicle Unit (SVU)	Vehicle Radio Set AN/VSQ-1
SVU Antenna	Antenna AS-3449/VSQ-1
Selectable Power Adapter (SPA)	Selectable Power Adapter PP-7641/VSQ-1
SVU BUU Mount	Resilient Mount MT-6146/VSQ-1
Auxiliary Ground Unit (AGU)	Ground Radio Set AN/GRC-210
AGU Antenna	Antenna AS-3445/TSQ-129
AGU Battery Case	Battery Case CY-7872/GRC-210
AGU Mount	Mount MT-6145/GRC-210
Fixed Wing Airborne Unit	Airborne Radio Set AN/ASQ-177(V)1
Rotary Wing Airborne Unit	Airborne Radio Set AN/ASQ-177(V)2
Airborne Power Adapter (APA)	Voltage Regulator CN-1547/ASQ-177(V)
Airborne Unit Mount, Fixed Wing	Resilient Mount MT-6143/ASQ-177(V)
Airborne Unit Mount, Rotary Wing	Resilient Mount MT-6144/ASQ-177(V)
Airborne Unit Antenna, Fixed Wing	Antenna AS-3446/ASQ-177(V)
Airborne Unit Antenna, Rotary Wing	Antenna AS-3447/ASQ-177(V)
Basic User Unit (BUU)	Receiver-Transmitter RT-1343/TSQ-129
User Readout (URO)	Control-Readout Unit C-10830/PSQ-4
Pilot Control Display Panel (PCDP)	Control Display Panel C-10829/ASQ-177(V)

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

ARMY. If your PLRS radio set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications - Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-MA-D, Fort Monmouth, New Jersey 07703-5007. We'll send you a reply.
MARINE CORPS USERS. Prepare SF 368 in accordance with instructions contained in MCO 4855.10.

SECTION II. EQUIPMENT DESCRIPTION AND DATA

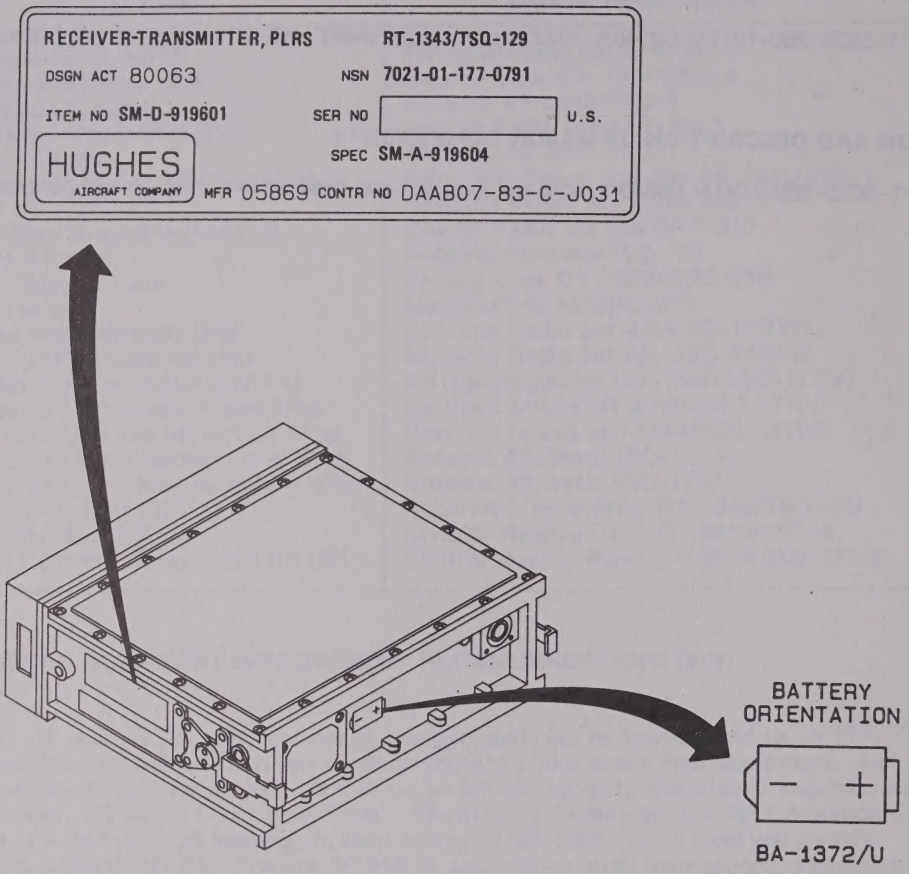
EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

See TM 11-5825-269-10/TM 08848A-10/2 for the equipment characteristics, capabilities and features.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

See TM 11-5825-269-10/TM 08848A-10/2 for location and description of major components.

RECEIVER-TRANSMITTER RT-1343/TSQ-129 IDENTIFICATION AND INSTRUCTION PLATES AND STENCILS (1 of 2)



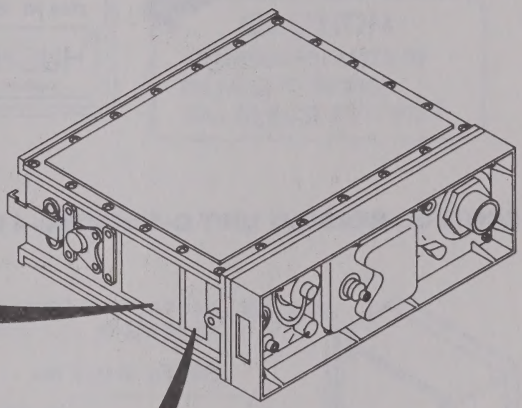
RECEIVER-TRANSMITTER RT-1343/TSQ-129 IDENTIFICATION AND INSTRUCTION PLATES AND STENCILS (2 of 2)

WARNING

REMOVE INTERIOR BATTERY
BEFORE SHIPMENT OR
INACTIVE STORAGE
OF 30 DAYS OR MORE

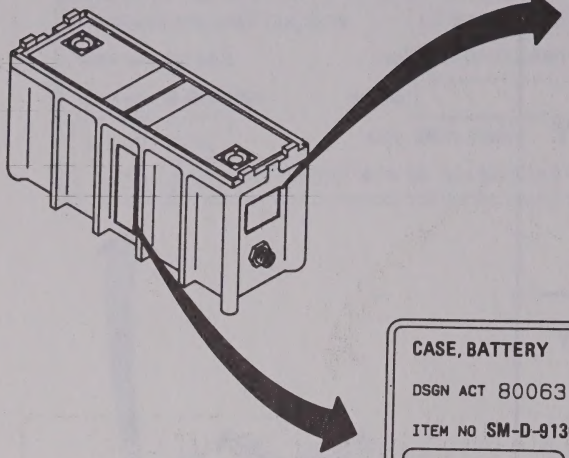
CHANGE INTERIOR BATTERY
EVERY 30 DAYS. USE
BATTERY BA1372 OR EQUIV.

DATE
DATE
DATE



CONTAINS
KGV-6(E-2)/TSEC
CONFIDENTIAL

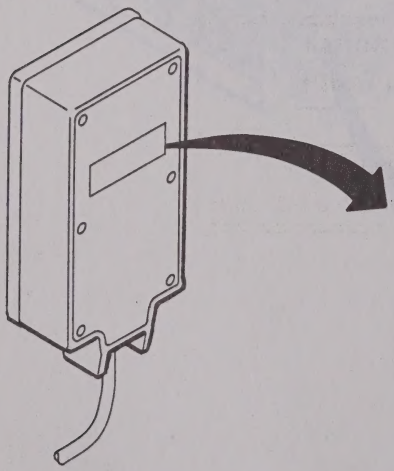
BATTERY CASE CY-7871/PSQ-4 IDENTIFICATION AND INSTRUCTION PLATES



WARNING
REMOVE BATTERIES BEFORE SHIPMENT OR INACTIVE STORAGE OF 30 DAYS OR MORE

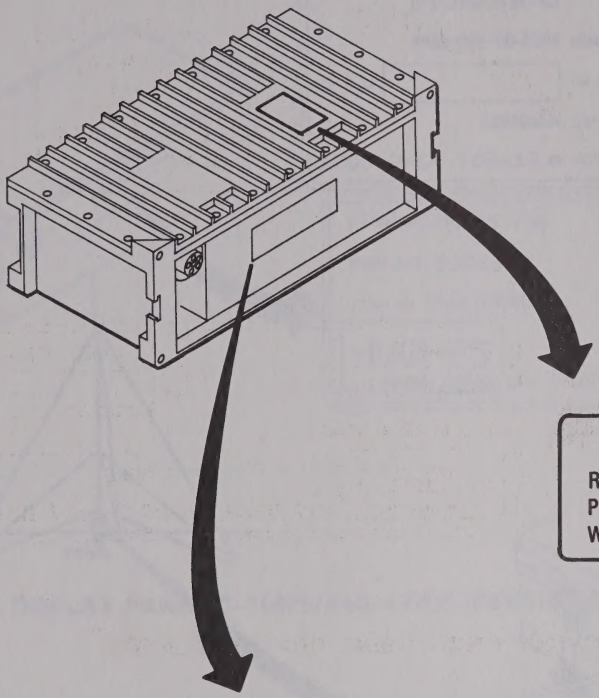
CASE, BATTERY CY-7871/PSQ-4
DSGN ACT 80063 NSN
ITEM NO SM-D-913015 SER NO U.S.
HUGHES AIRCRAFT COMPANY SPEC NONE
MFR 05869 CONTR NO DAAB07-83-C-J031

CONTROL-READOUT UNIT C-10830/PSQ-4 IDENTIFICATION PLATE



CONTROL-READOUT UNIT C-10830/PSQ-4
DSGN ACT 80063 NSN 7021-01-177-0789
ITEM NO SM-D-912831 SER NO U.S.
HUGHES AIRCRAFT COMPANY SPEC SM-A-912834
MFR 05869 CONTR NO DAAB07-83-C-J031

SELECTABLE POWER ADAPTER PP-7641/VSQ-1 IDENTIFICATION AND CAUTION PLATES

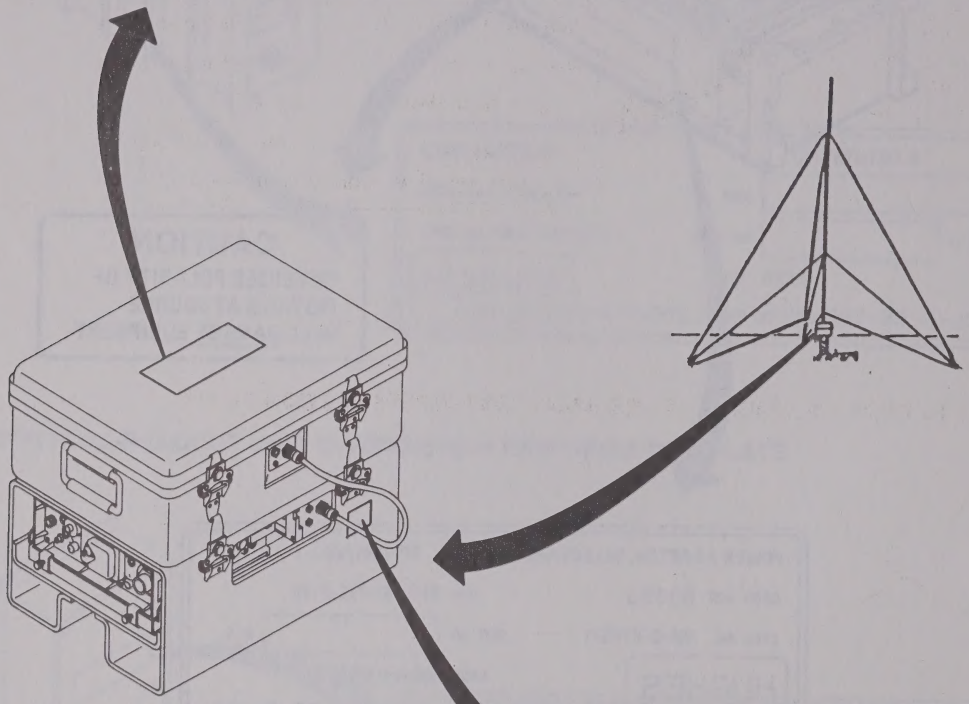


CAUTION
REVERSED POLARITY OF
PIGTAILS AT SOURCE
WILL DAMAGE EQUIPMENT

POWER ADAPTER, SELECTABLE PP-7641/VSQ-1
DSGN ACT 80063 NSN 6110-01-175-7312
ITEM NO SM-D-919521 SER NO [ ] U.S.
SPEC SM-A-919524
HUGHES AIRCRAFT COMPANY MFR 05869 CONTR NO DAAB07-83-C-J031

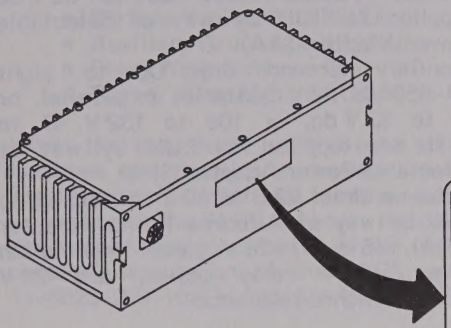
GROUND RADIO SET AN/GRC-210 IDENTIFICATION AND CAUTION PLATES

CASE, BATTERY CY-7872/GRC-210
DSGN ACT 80063 NSN 5825-01-166-9089
ITEM NO A3004991 SER NO U.S.
HUGHES AIRCRAFT COMPANY SPEC A3004994
MFR 05869 CONTR NO DAAB07-83-C-J031



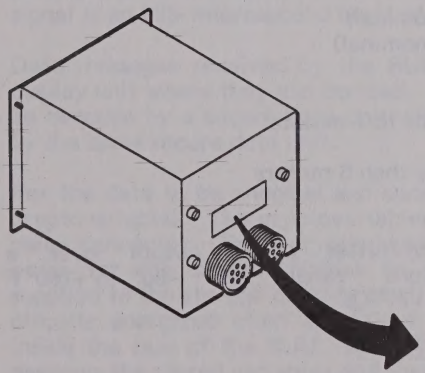
CAUTION
REVERSED POLARITY OF PIGTAILS AT SOURCE WILL DAMAGE EQUIPMENT

VOLTAGE REGULATOR CN-1547/ASQ-177(V) IDENTIFICATION PLATE



REGULATOR, VOLTAGE CN-1547/ASQ-177(V)
DSGN ACT 80063 NSN 6110-01-172-5353
ITEM NO SM-D-919491 SER NO U.S.
HUGHES AIRCRAFT COMPANY SPEC SM-A-919494
MFR 05869 CONTR NO DAAB07-83-C-J031

CONTROL DISPLAY PANEL C-10829/ASQ-177(V) IDENTIFICATION PLATE



CONTROL DISPLAY PANEL C-10829/ASQ-177(V)
DSGN ACT 80063 NSN 7021-01-179-5515
ITEM NO SM-D-912531 SER NO U.S.
HUGHES AIRCRAFT COMPANY SPEC SM-A-912534
MFR 05869 CONTR NO DAAB07-83-C-J031

EQUIPMENT DATA

Power Requirements	• BUU (all configurations): BA-1372/U keep-alive battery • Manpack Unit: Two BA-5590/U 28 V batteries (one active and one spare) • Surface Vehicle Unit: 20 to 32 V dc supplied to BUU by way of Selectable Power Adapter (SPA) • Auxiliary Ground Unit: Up to eight BA-5590/U 28 V batteries in parallel, or 20 to 32 V dc, or 108 to 132 V 47 to 63 Hz ac, supplied to BUU by way of Selectable Power Adapter (SPA) • Airborne Unit: 22.5 to 30 V dc supplied to BUU by way of Airborne Power Adapter (APA), +5 V or +28 V panel illumination power, +28 V relay power, and 26 V 400 Hz synchro reference
Prime Power Consumption	8 to 10 watts. For manpack unit, approximately 16 hours of operation from one BA-5590/U battery.
Transmitter Power Output:	The four automatically selected power levels are as follows: • 100 watts • 20 watts • 3 watts • 0.4 watt
Frequency Range:	420 to 450 MHz
Transmission/Reception Range	
Ground-to-Ground	10 km (nominal)
Ground-to-Air	100 km (nominal)
Minimum Distance Between Units	1 meter
Net Entry Response Time	10 seconds to 1 minute
TOA measurement accuracy on line-of-sight link	Error less than 6 meters
Operating Temperature Range	Full transmitter power output over a temperature range of -65° to +160° F (-54° to +71° C)
Operating Altitude	Up to 50,000 ft

Section III. PRINCIPLES OF OPERATION

The five configurations of the user unit radio set function in a similar manner. The five configurations are as follows:

- Manpack Unit (MPU)
- Surface Vehicle Unit (SVU)
- Auxiliary Ground Unit (AGU)
- Fixed Wing Airborne Unit
- Rotary Wing Airborne Unit

When the user turns on the user unit and cryptovariables have been loaded, the user unit becomes and remains a member of the PLRS network. The user unit then provides its identification number and location automatically to the master station. When the user unit is a member of the PLRS network, the user can request data exchange between the user unit and the master station or between the user unit and another member of the PLRS network. For a detailed description of the PLRS network and the capabilities of the user unit, see TM 11-5825-269-10/TM 08848A-10/2 and TM 11-5825-268-10/TM 08848A-10/1.

The five configurations of user units include a basic user unit (BUU) as the fundamental component. The configurations differ in the power source for the BUU, the type of control and display unit used, and/or the type of antenna.

The BUU contains transmit, receive, and signal and message processing circuits. The BUU requires an 18.5 volt to 32 volt dc power source and an external antenna. When the manpack battery case is used as a source of power, the BUU automatically turns off when the battery voltage drops below 19.75 V. All user unit configurations use a control and display unit; a user readout unit (URO) for ground-based user units and a pilot control and display panel (PCDP) for airborne user units.

The transmit and receive frequency and transmit power level are controlled by commands received from the master station. The master station also adjusts the time reference in the BUU to the time reference in the master station. The BUU transmits and receives in the frequency band from 420 MHz to 450 MHz. The transmit output power of the BUU, as commanded by the master station, is 0.4 watt, 3 watts, 20 watts, or 100 watts. The transmit signal is an 825-microsecond burst of continuous phase shift modulated (CPSM) rf.

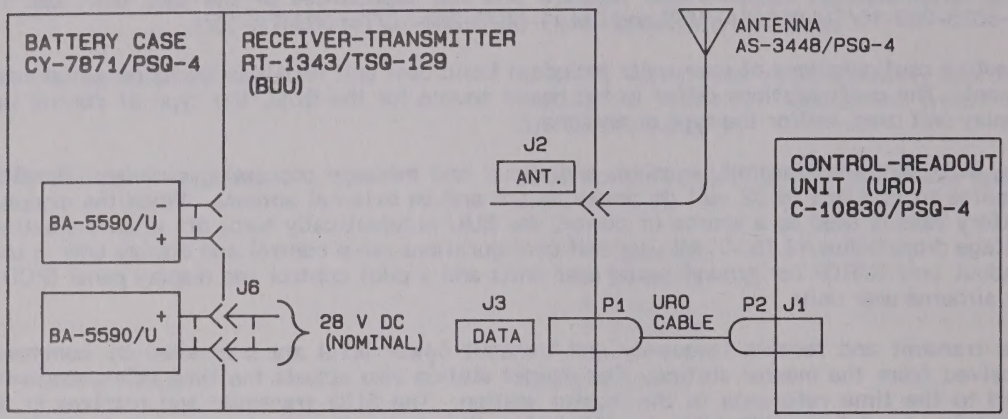
Data messages received by the BUU are demodulated, decoded, and sent to the control and display unit where they can be read. All PLRS data received by the BUU is encoded and must be decoded by a secure data unit within the BUU. All data transmitted by the BUU is encoded by the same secure data unit.

For the data to be encoded and decoded, the secure data unit must be loaded with a set of cryptovariables. The cryptovariables are loaded into the secure data unit through a BUU front panel connector. Those cryptovariables are electronically stored in the secure data unit. In order for the cryptovariables to remain electronically stored, electrical power must be supplied to the storage circuits at all times. A keep-alive battery is used to keep the storage circuits energized when the prime power is turned off. This keep-alive battery is located inside the rear of the BUU. When the keep-alive battery is replaced, the power interruption destroys the stored variables and they must be reloaded.

MANPACK UNIT - The manpack unit consists of the BUU (Receiver-Transmitter RT-1343/TSQ-129, Battery Case CY-7871/PSQ-4, the URO (Control-Readout Unit C-10830/PSQ-4), and Antenna AS-3448/PSQ-4 (see illustration below). Power for the manpack unit is supplied by a 28-volt BA-5590/U battery inside the battery case. The battery case contains two BA-5590/U batteries, but only one is used. When one battery is no longer useful, the battery case is removed, rotated 180 degrees, and reinstalled on the BUU. This disconnects the discharged battery from the BUU and connects the second battery. Each battery provides approximately 16 hours of operation.

The URO provides the operator interface with the PLRS network. Data received by the BUU is displayed on the URO, and user messages to be transmitted by the BUU are keyed in on the URO. The URO is electrically connected to the BUU by a flexible, multiconductor cable.

The manpack antenna is a 50-ohm dipole antenna. The antenna mounts directly in the antenna connector on the BUU front panel.



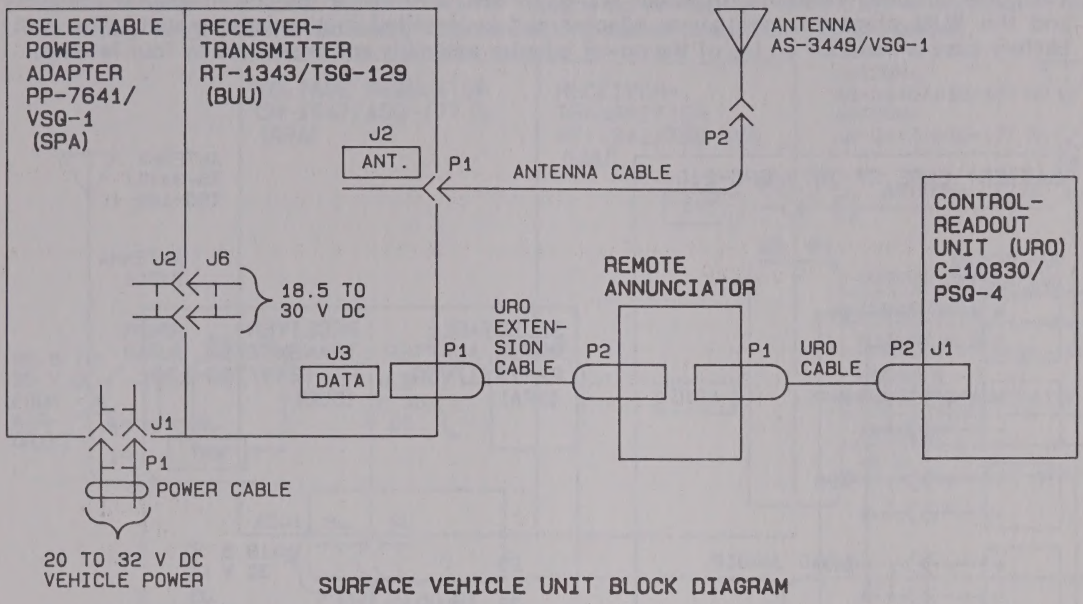
MANPACK UNIT

SURFACE VEHICLE UNIT (SVU) - The SVU contains a BUU and a URO like the MPU. However, the SVU receives its power from the vehicle, and the antenna and URO are mounted in locations remote from the BUU. The vehicle power is supplied to the BUU by Selectable Power Adapter PP-7641/VSQ-1 (SPA) (see illustration on facing page). The SPA filters the vehicle power and protects the BUU from overvoltage. The vehicle power may range from 20 to 32 V dc.

The URO is connected to the BUU by means of the URO cable and the URO extension cable. The URO extension cable connects the BUU to a remote annunciator. The remote annunciator provides an audible alarm signal at the URO location. The URO cable connects the URO to the remote annunciator.

The SVU uses Antenna AS-3449/VSQ-1. This antenna assembly is mounted on the vehicle either directly or by means of a mounting bracket.

Vehicle power is supplied to the SVU by a power cable that plugs into the power adapter. The power adapter mounts in Resilient Mount MT-6146/VSQ-1. The BUU plugs into the power adapter and is secured to the same mount.



SURFACE VEHICLE UNIT BLOCK DIAGRAM

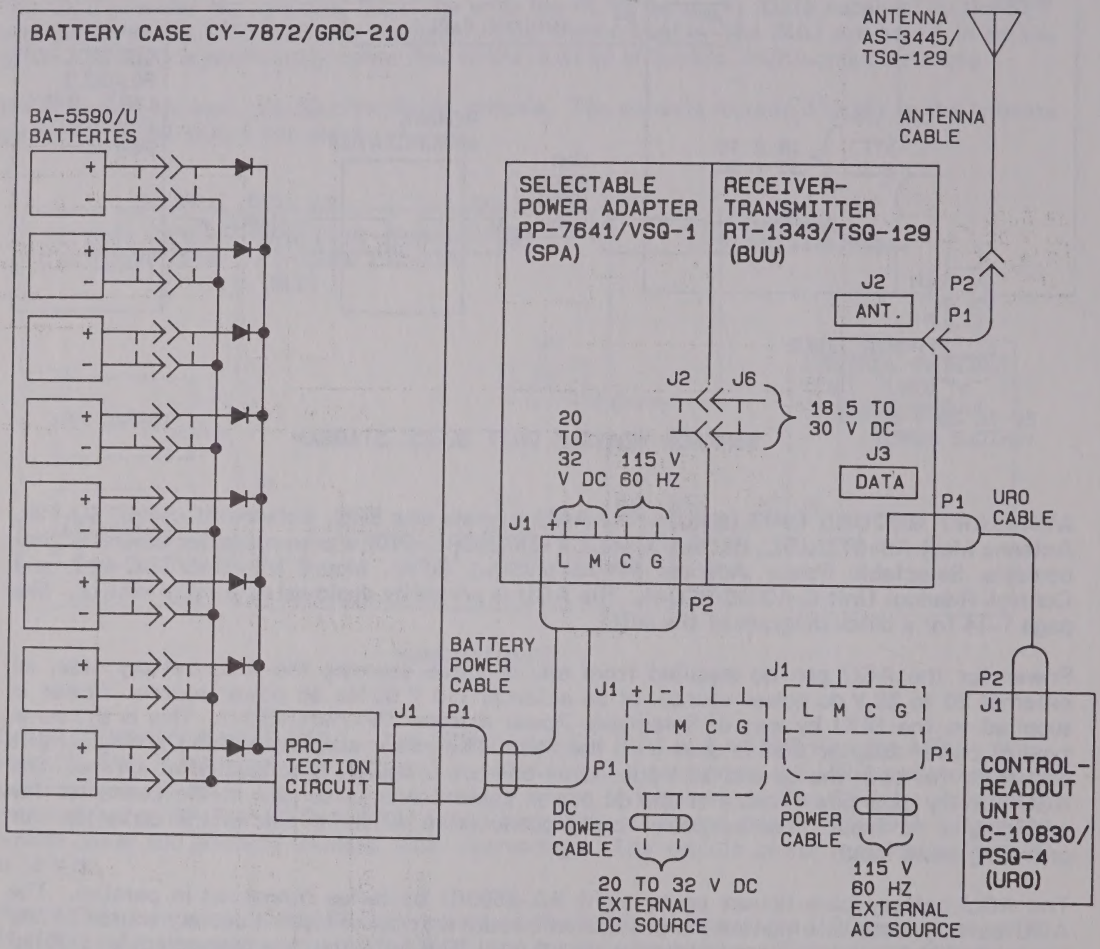
AUXILIARY GROUND UNIT (AGU) - The AGU consists of a BUU, Antenna AS-3445/TSQ-129, Antenna Mast AB-577/GRC, Battery Case CY-7872/GRC-210, a power adapter assembly that contains Selectable Power Adapter PP-7641/VSQ-1 (SPA), Mount MT-6145/GRC-210, and Control-Readout Unit C-10830/PSQ-4. The AGU is primarily deployed as a relay station. See page 1-14 for a block diagram of the AGU.

Power for the AGU can be supplied from one of three sources; the AGU battery case, an external 20 to 32 V dc power source, or an external 115 V 60 Hz ac power source. Power is supplied to the BUU by way of Selectable Power Adapter PP-7641/VSQ-1. This is the same type of power adapter that is used with the SVU. The power adapter contains a single input connector for both the dc and ac input. Only one power source is connected at a time. The AGU battery case power cable or the dc power cable connects to pins in the connector for providing a dc input. The ac power cable connects to different pins in the connector for providing an ac input.

The AGU battery case houses up to eight BA-5590/U batteries connected in parallel. The AGU battery case also contains a protective circuit that turns off the battery source to the BUU when the output voltage is below 20 $\pm$0.5 V. The batteries are connected in parallel through diodes to isolate low batteries so that they do not attempt to charge from the other batteries. The AGU battery case is connected to the power adapter by a power cable that is stowed in the cover of the AGU battery case.

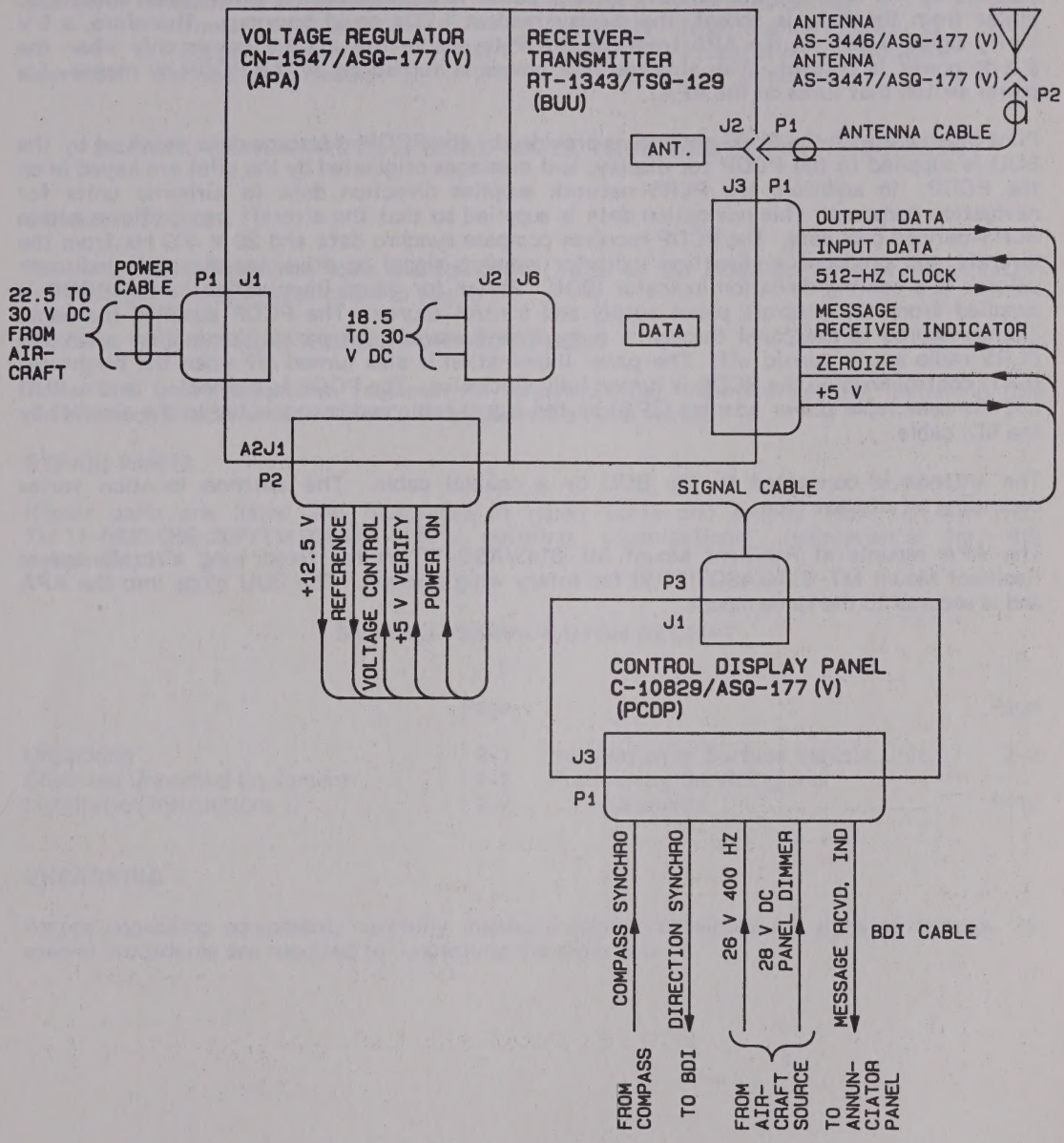
Antenna AS-3445/TSQ-129 mounts on top of an antenna mast in order to place the antenna as high as possible for improved communications range. The antenna is connected to the BUU by the antenna cable.

The power adapter is installed in Mount MT-6145/GRC-210 inside the power adapter assembly and the BUU plugs into the power adapter and is installed in the same mount. The AGU battery case is installed on top of the power adapter assembly and is secured by four latches.



AUXILIARY GROUND UNIT BLOCK DIAGRAM

AIRBORNE UNITS - The fixed wing and rotary wing airborne units are functionally identical and differ only by the antenna and resilient mount they use. The airborne units consist of a BUU, Control Display Panel C-10829/ASQ-177(V), Voltage Regulator CN-1547/ ASQ-177(V), Antenna AS-3446/ASQ-177(V) for fixed wing or Antenna AS-3447/ASQ-177(V) for rotary wing, Resilient Mount MT-6143/ASQ-177(V) for fixed wing or Resilient Mount MT-6144/ASQ-177(V) for rotary wing, and the necessary interconnecting cables (see block diagram below).



AIRBORNE UNIT BLOCK DIAGRAM

The airborne unit receives 22.5 to 30 V dc power from the aircraft. This power is supplied to the airborne power adapter (APA). The APA provides 18.5 to 30 V dc power to the BUU and variable +12.5 V power to the PCDP. The variable +12.5 V power is supplied to the PCDP to light the display readout LEDs and is varied by means of the BRT (brightness) control on the PCDP. The display readout circuits also require 5 V dc logic power. This logic power is supplied by the BUU. If the variable +12.5 V power is supplied to the PCDP when the 5 V dc power from the BUU is absent, the display readout LEDs could burn out. Therefore, a 5 V verify signal is sent to the APA from the PCDP to enable the +12.5 V power only when the 5 V dc power is present. The airborne unit power is turned on at the PCDP by means of a power switch that turns on the APA.

Pilot interface with the PLRS network is provided by the PCDP. Message data received by the BUU is supplied to the PCDP for display, and messages originated by the pilot are keyed in on the PCDP. In addition, the PLRS network supplies direction data to airborne units for navigation purposes. This navigation data is supplied so that the aircraft can be flown within PLRS-defined corridors. The PCDP receives compass synchro data and 26 V 400 Hz from the aircraft and produces a direction indicator synchro signal to drive the direction indicator pointer in a bearing deviation indicator (BDI). Power for panel illumination in the PCDP is supplied from the aircraft panel supply and control source. The PCDP supplies the panel dimmer source to the panel through a relay that turns off the panel illumination when the PLRS radio set is turned off. The panel illumination is also turned off when the brightness (BRT) control knob on the PCDP is turned fully clockwise. The PCDP is connected to the BUU and the selectable power adapter (SPA) by the signal cable and is connected to the aircraft by the BDI cable.

The antenna is connected to the BUU by a coaxial cable. The antenna location varies depending on aircraft type.

The APA mounts in Resilient Mount MT-6143/ASQ-177(V) for fixed wing aircraft and in Resilient Mount MT-6144/ASQ-177(V) for rotary wing aircraft. The BUU plugs into the APA and is secured to the same mount.

CHAPTER 2
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

		Page			Page
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			Section IV	Maintenance Procedures	2-58
Section II	Service Upon Receipt	2-1	Section V	Preparation for Storage or Shipment	2-115

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

COMMON TOOLS

For all authorized common tools and equipment, refer to the modified table of organization and equipment (MTOE) applicable to your unit.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Tools and test equipment required for organizational maintenance are listed in the maintenance allocation chart (MAC) in appendix B of this manual.

REPAIR PARTS

Repair parts are listed and illustrated in repair parts and special tools list (RPSTL), TM 11-5825-269-20P/TM 08848A-20P/1 covering organizational maintenance for this equipment.

Section II. SERVICE UPON RECEIPT

	Page		Page
Unpacking	2-1	Installation of Surface Vehicle Unit	2-2
Checking Unpacked Equipment	2-2	Preliminary Servicing and Adjustments	2-12
Installation Instructions	2-2		

UNPACKING

Before unpacking equipment, carefully inspect shipping containers for signs of damage. No special procedures are required for unpacking the radio sets.

CHECKING UNPACKED EQUIPMENT

- Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report damage on DD Form 6, Packing Improvement Report.
- Check the equipment against the packing slip to see if the equipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.
- Check to see whether the equipment has been modified.

INSTALLATION INSTRUCTIONS

For all radio sets, a keep-alive battery must be installed in the BUU before any further assembly. See TM 11-5825-269-10/TM 08848A-10/2 for installation of the keep-alive battery. Only the surface vehicle and airborne radio sets require installation. The manpack radio set is portable and the auxiliary ground unit radio set is emplaced as part of the PLRS system emplacement.

INSTALLATION OF SURFACE VEHICLE UNIT - The detailed installation procedure for surface vehicle units depends on the type of vehicle in which it is installed. There is a different installation kit for each type of vehicle. All of the installation kits contain the same major components and differ only in some of the miscellaneous hardware items, such as adapter plates, cable clamping kits, and cable terminations. The basic contents of each type of installation kit are as follows:

- Resilient Mount MT-6146/VSQ-1
- Selectable Power Adapter PP-7641/VSQ-1
- Antenna AS-3449/VSQ-1
- URO mounting bracket A3006116
- Remote annunciator
- Antenna cable SM-C-911480
- URO extension cable A3004928
- URO cable SM-D-912805
- Power cable A3004939

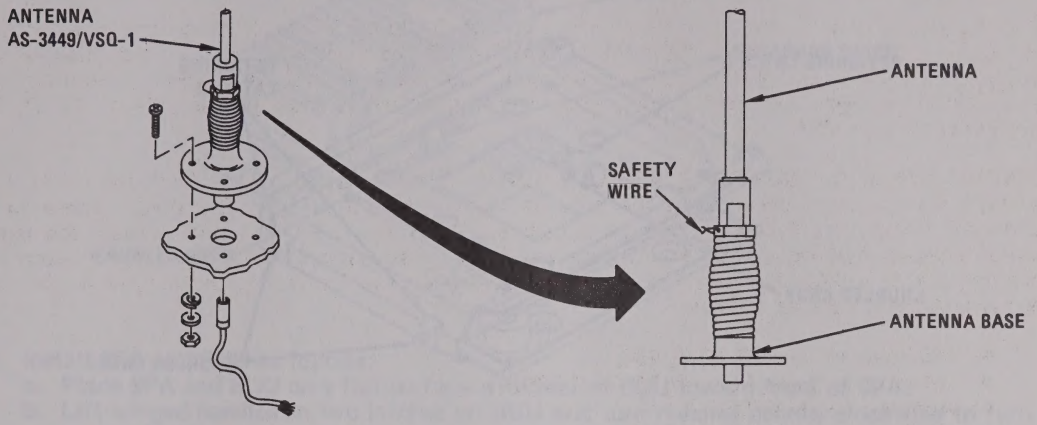
The basic procedure for installing a surface vehicle unit in any type of vehicle is as follows:

1. Install Resilient Mount MT-6146/VSQ-1. See illustration on pages 2-8 and 2-9 for space requirements and mounting hole pattern. The equipment mounted in the resilient mount should have 2 inches (5.08 cm) of clearance in all directions for sway of the resilient mount. In some vehicles the sway clearance will be less than the desired 2 inches because of space limitations. In addition, hand clearance is required for the circuit breaker and connector on the selectable power adapter, and hand and visual access is required for the front panel.

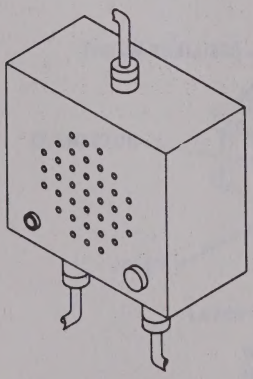
INSTALLATION INSTRUCTIONS (cont)

INSTALLATION OF SURFACE VEHICLE UNIT (cont)

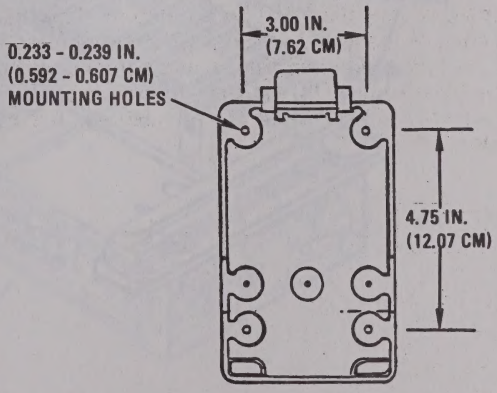
2. Install Antenna AS-3449/VSQ-1. Verify that antenna is tight in antenna base and is safety wired to base.



3. Install remote annunciator. See illustration below.
4. Install URO mounting bracket. See illustration below.



REMOTE ANNUNCIATOR

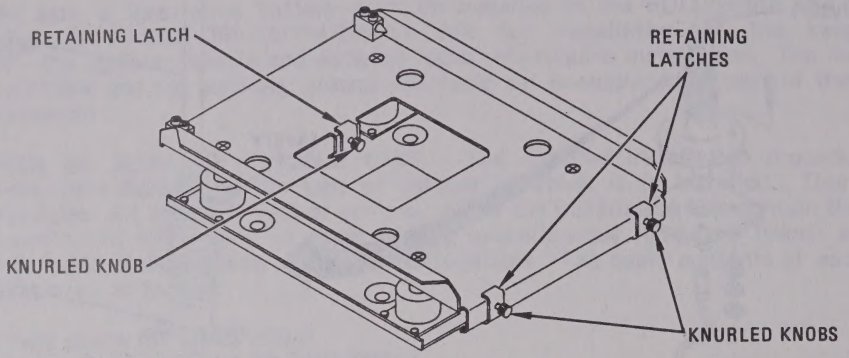


URO MOUNTING BRACKET

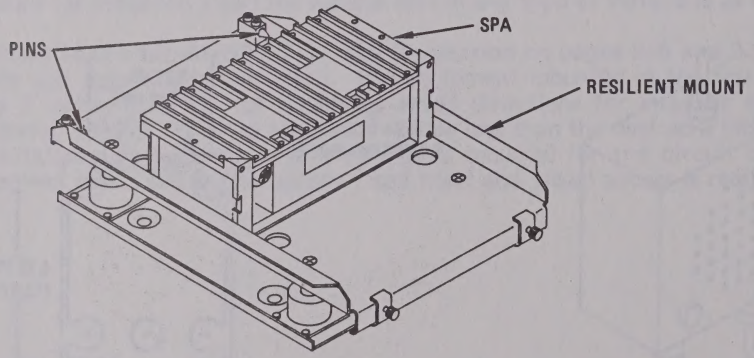
INSTALLATION INSTRUCTIONS (cont)

INSTALLATION OF SURFACE VEHICLE UNIT (cont)

5. If the BUU is to be installed immediately, skip this step and proceed to step 6. If the BUU is not going to be installed, perform the following, then skip to step 7.
   a. Turn three knurled knobs counterclockwise until three retaining latches drop to their lowest position.



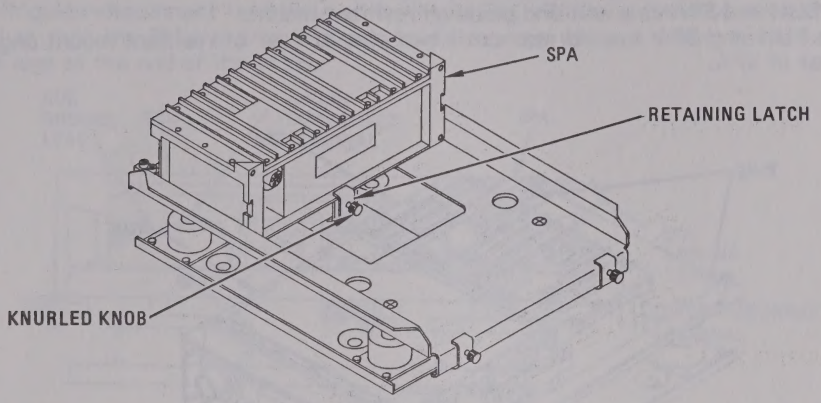
   b. Place SPA on resilient mount and slide SPA to rear of mount so that it engages pins at rear of mount.



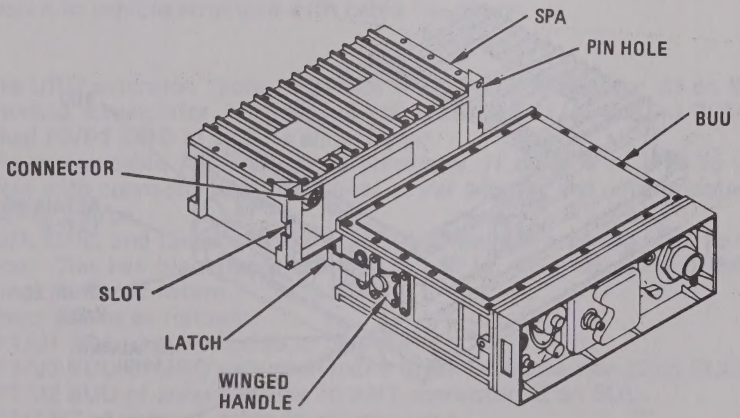
INSTALLATION INSTRUCTIONS (cont)

INSTALLATION OF SURFACE VEHICLE UNIT (cont)

c. Lift retaining latch to engage SPA and turn knob clockwise to secure.



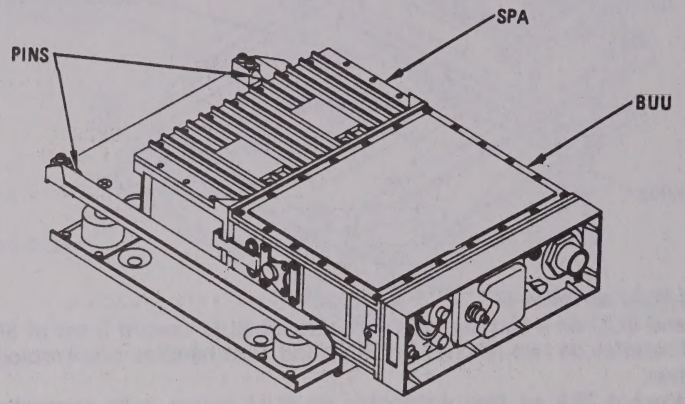
6. Install SPA and BUU as follows:
   a. Place SPA and BUU on a flat surface with rear of BUU toward front of SPA.
   b. Lift winged handles on two latches on BUU and turn handles counterclockwise to fully extend latches.
   c. Slide BUU toward SPA so that connector on BUU mates with connector on SPA and pins on BUU mate with pin holes in SPA.
   d. Engage latches with slots in SPA and turn winged handles clockwise approximately 1/2 turn to secure BUU to SPA.



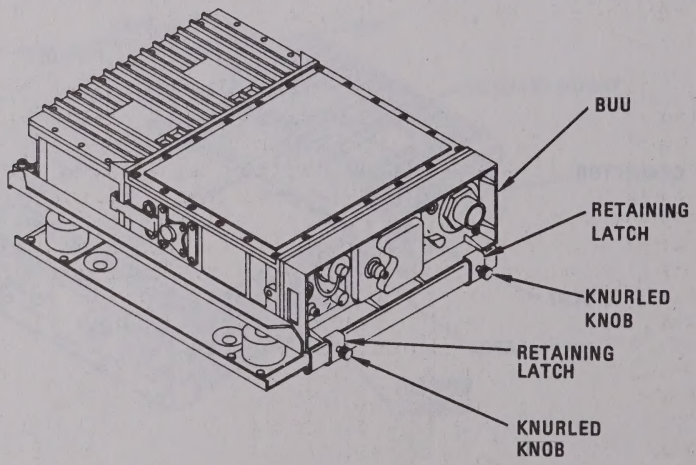
INSTALLATION INSTRUCTIONS (cont)

INSTALLATION OF SURFACE VEHICLE UNIT (cont).

7. Install BUU and SPA on resilient mount as follows:
   a. Lift BUU and SPA as a unit and place on resilient mount.
   b. Slide BUU and SPA toward rear until two pins at rear of resilient mount engage holes in rear of SPA.



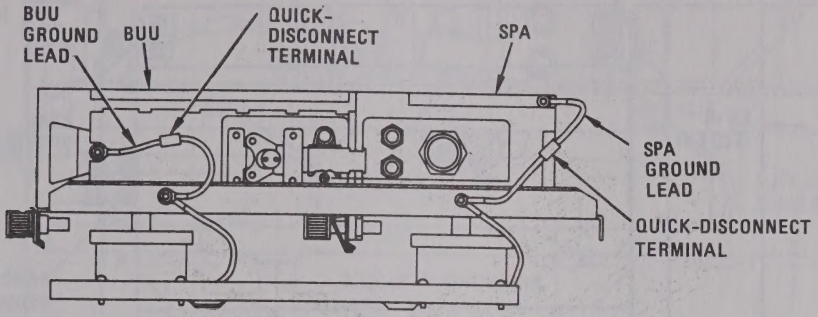
   c. Lift two retaining latches so they engage BUU and turn knurled knobs clockwise to secure BUU to mount.



INSTALLATION INSTRUCTIONS (cont)

INSTALLATION OF SURFACE VEHICLE UNIT (cont)

8. Secure ground leads to BUU and SPA, respectively. These ground leads are two-piece leads with quick-disconnect terminals at their centers. These quick-disconnect terminals are used so that the BUU and/or SPA can be dismounted without having to disconnect the terminal lugs at the end of the leads.



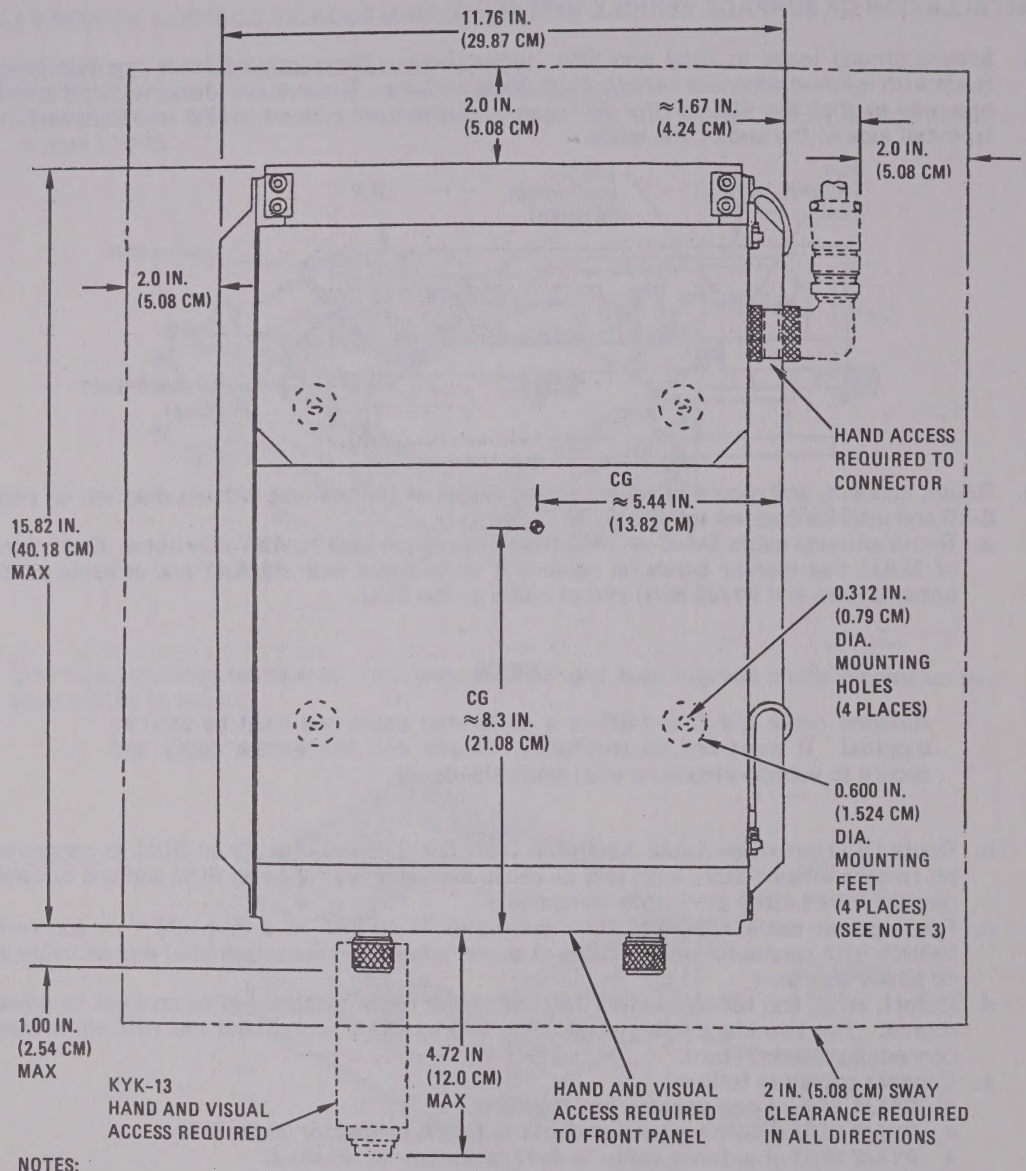
9. Route, connect, and secure interconnecting cables as follows (see cabling diagram on page 2-10 and interconnection schematic on page 2-11:
   a. Route antenna cable SM-C-911480 from base of antenna to **ANT** connector J2 on front of BUU. See marker bands on cable and route cable with **P2/ANT** end of cable at the antenna base and **P1/J2 BUU** end of cable at the BUU.

NOTE

Antenna cable SM-C-911480 is a calibrated cable and must be used as supplied. It must not be shortened. Neatly coil the excess cable and secure to vehicle structure with cable tie-downs.

   b. Route URO extension cable A3004928 from **DATA** connector J3 on BUU to connector on remote annunciator, with end of cable marked **P1/J3 BUU** at BUU and end of cable marked **P2/P1 URO** at remote annunciator.
   c. Route power cable A3004939 from connector J1 on SPA to a 20 to 32 V dc source in vehicle with connector end of cable at power adapter and unterminated end of cable at dc power source.
   d. Cutoff, strip, and terminate four leads of power cable as required to connect to power source. The two black leads connect to +20 to +32 V source and the two white leads connect to the dc return.
   e. Connect cables as follows:
      - **P1/J1 SPA** of power cable to J1 on SPA.
      - **P1/J3 BUU** of URO extension cable to **DATA** connector J3 on BUU.
      - **P1/J2 BUU** of antenna cable to **ANT** connector J2 on BUU.
      - **P2/ANT** of antenna cable to antenna base.
      - **P2/P1 URO** of URO extension cable to connector on remote annunciator.
      - P1 of URO cable to connector on remote annunciator.
      - P2 of URO cable to URO.
   f. Secure ends of cables to vehicle structure with cable tie-downs not more than 12 inches (30.5 cm) from connectors and secure cables along entire length at intervals not more than 12 inches (30.5 cm). Do not secure URO cable.

INSTALLATION INSTRUCTIONS (cont)

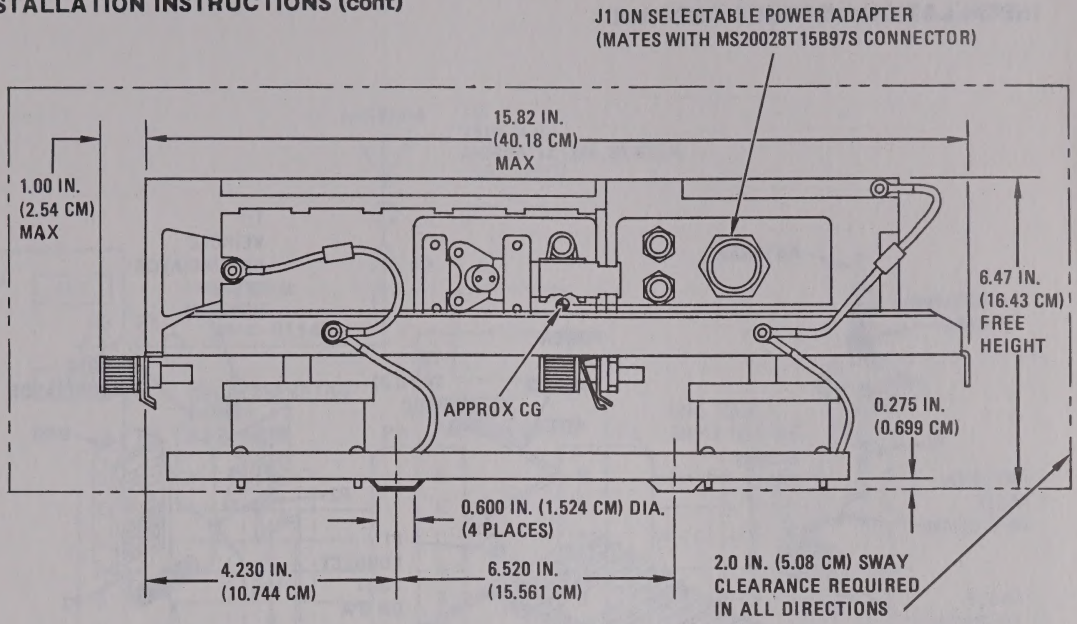


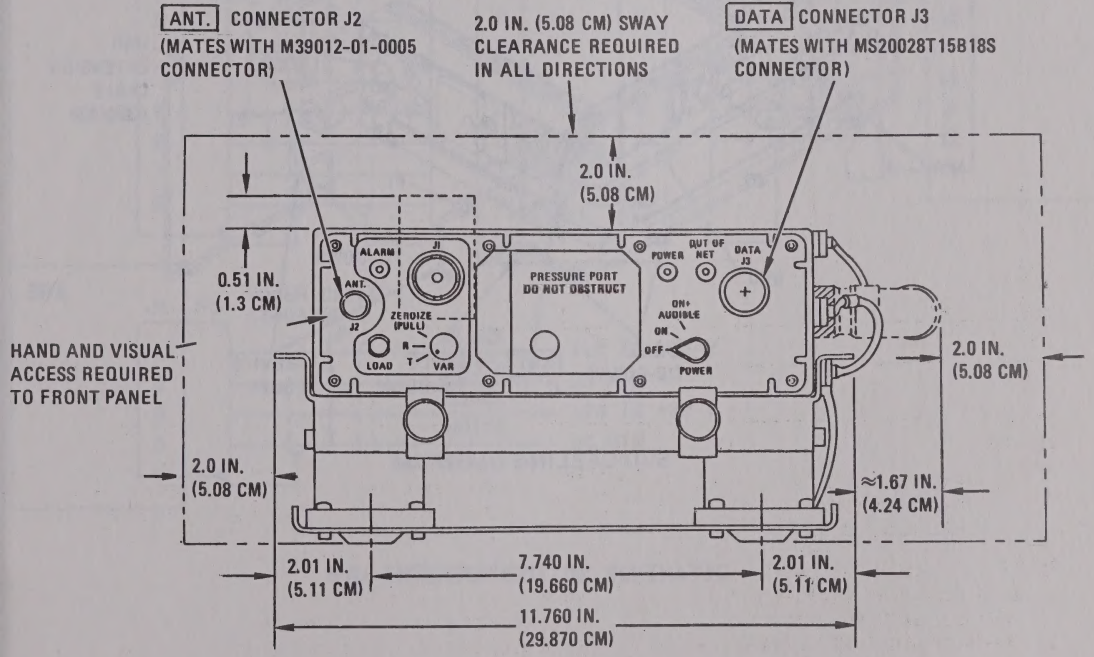
NOTES:

1. ESTIMATED HEAT DISSIPATED BY THIS UNIT IS 27 WATTS MAXIMUM
2. MAXIMUM WEIGHT OF EQUIPMENT SHOWN IS 28.5 POUNDS (12.93 KG)
3. AREA UNDER 4 MOUNTING FEET MUST BE FREE OF PAINT AND PRIMER TO AFFORD GOOD ELECTRICAL BONDING

SVU OUTLINE AND MOUNTING (1 of 2)

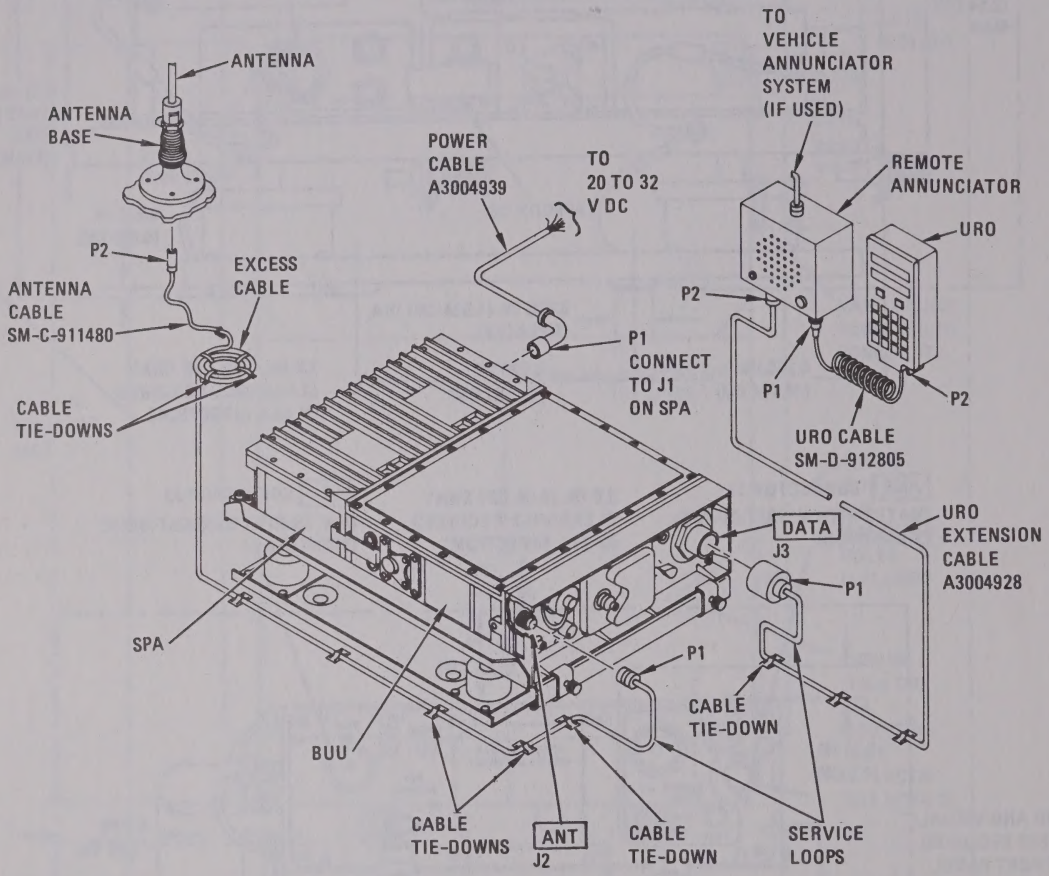
INSTALLATION INSTRUCTIONS (cont)





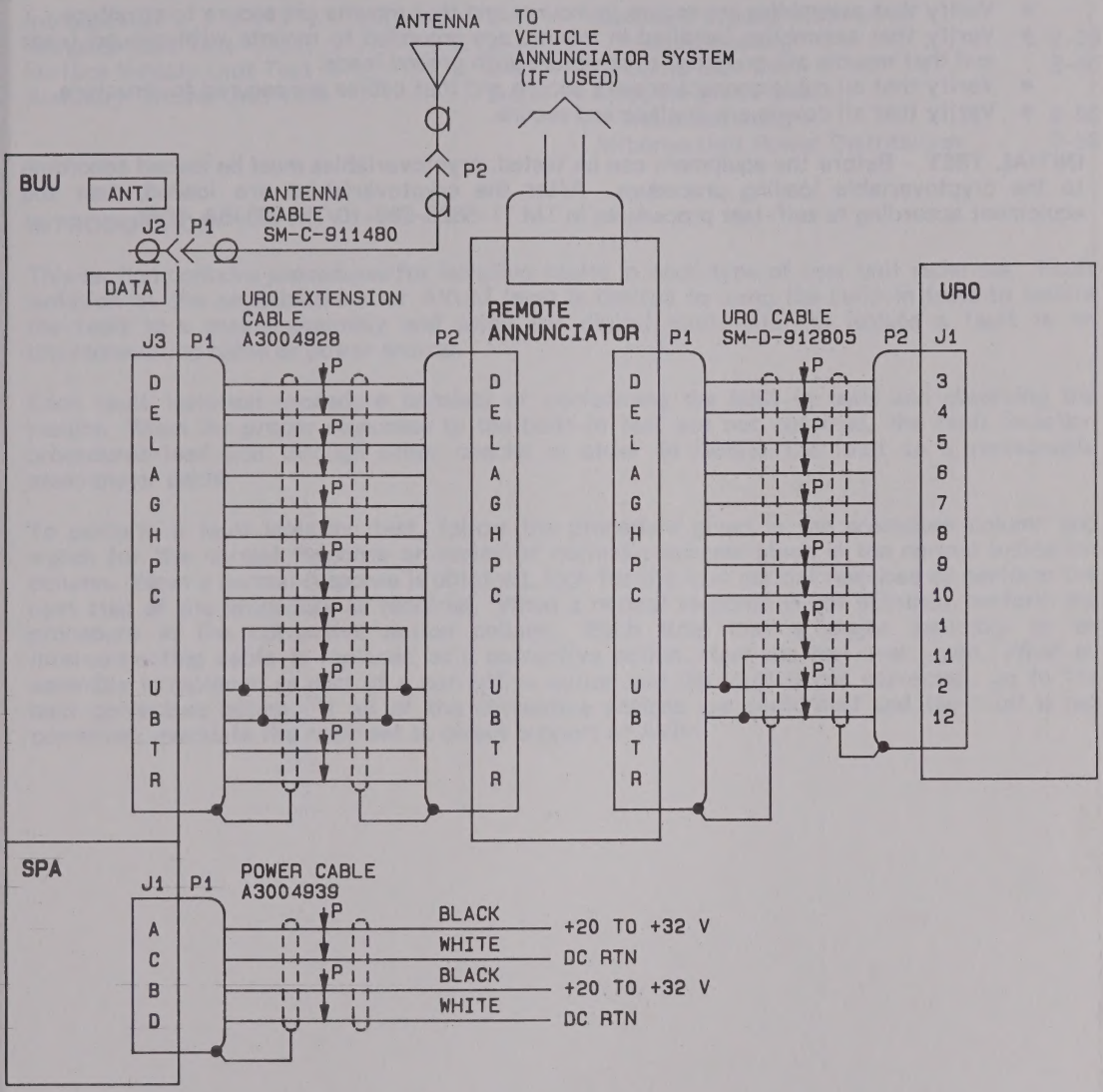
SVU OUTLINE AND MOUNTING (2 of 2)

INSTALLATION INSTRUCTIONS (cont)



SVU CABLING DIAGRAM

INSTALLATION INSTRUCTIONS (cont)



SVU INTERCONNECTION SCHEMATIC

PRELIMINARY SERVICING AND ADJUSTMENTS

PRELIMINARY CHECKS - Perform the following checks before turning on the equipment for testing:

- Verify that assemblies are secure in mounts and that mounts are secure to structure.
- Verify that assemblies installed in mounts are grounded to mounts with ground leads and that mounts are grounded to structure with ground leads.
- Verify that all cable connections are secure and that cables are secured to structure.
- Verify that all covers are in place and secure.

INITIAL TEST - Before the equipment can be tested, cryptovariables must be loaded according to the cryptovariable loading procedure. After the cryptovariables are loaded, test the equipment according to self-test procedures in TM 11-5825-269-10/TM 08848A-10/2.

Section III. TROUBLESHOOTING

	Page		Page
Introduction	2-13	Auxiliary Ground Unit Power Troubleshooting	2-39
Manpack Unit Test	2-14	Airborne Unit Test	2-44
Surface Vehicle Unit Test	2-21	Airborne Unit Power Troubleshooting	2-53
Auxiliary Ground Unit Test	2-31	Airborne Unit Power Distribution	2-56

INTRODUCTION

This section contains procedures for isolating faults in each type of user unit radio set. Fault isolation at the organizational or AVUM level is limited to using the built-in tests to isolate the fault to a major assembly and using the digital multimeter to isolate a fault to an interconnecting cable or power source.

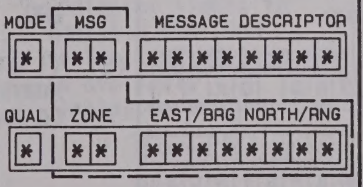
Each fault isolation procedure consists of performing the built-in tests and observing the results. When the proper responses to the built-in test are not obtained, the fault isolation procedures lead you through other checks in order to isolate the fault to a replaceable assembly or cable.

To perform a fault isolation test, follow the procedure given in the procedure column and watch for the normal response or series of normal responses given in the normal indication column. When a normal response is obtained, look for the next normal response or perform the next step of the procedure as required. When a normal response is not obtained, perform the procedure in the corrective action column. Each time that a major assembly or an interconnecting cable is replaced as a corrective action, start the test over again. When an assembly is replaced as part of a corrective action and the fault is not corrected, go to the next corrective action. If all of the corrective actions are performed and the fault is not corrected, evacuate the radio set to direct support or AVIM.

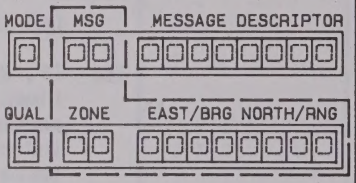
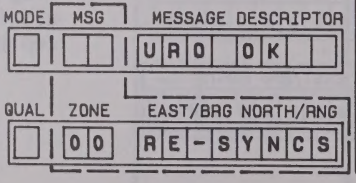
MANPACK UNIT TEST (1 of 7)

Procedure	Normal Indication	Correction Action
1. On BUU front panel, set **POWER** switch to **OFF** then to **ON** + **AUDIBLE**.	**POWER** indicator comes on and stays on, and **ALARM** indicator comes on for 1 second then goes off. After a delay of 1 to 2 seconds, **OUT OF NET** indicator blinks three times at 3/4-second on and 1/4-second off intervals and audible alarm sounds simultaneously.	(1) If no BUU indicators light or blink, perform the following: (a) Replace battery and repeat test. (b) Measure battery voltage. • If battery voltage is greater than 20.5 V dc, replace BUU. • If battery voltage is zero (fuses blown) and battery has replaceable fuses, replace fuses and replace BUU. If battery does not have replaceable fuses, replace battery and replace BUU. (c) Disconnect URO cable from **DATA** connector on BUU and repeat test. • If indicator response is correct, replace URO and/or URO cable. • If indicator response is not correct, replace BUU. (2) If **POWER** indicator comes on but **ALARM** indicator does not come on for 1 second, replace BUU.

MANPACK UNIT TEST (2 of 7)

Procedure	Normal Indication	Correction Action
1. (cont)		(3) If **OUT OF NET** indicator does not blink three times, or if **OUT OF NET** indicator stays on continuously, replace BUU. (4) If audible alarm does not sound, replace BUU. (5) If **ALARM** indicator stays on continuously, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace keep-alive battery, reload cryptovariables, and repeat test. (c) Replace BUU. (6) If, after blinking three times with audible alarm accompaniment, **OUT OF NET** indicator blinks once or twice at 1 second on and 1/4 second off accompanied by the audible alarm, replace BUU. These blinks may be followed by one or more 1/8-second blinks accompanied by the audible alarm.
2. Observe display on URO.	a. **MSG RCVD** and **OUT OF NET** indicators on URO remain off and URO displays the following: 	(1) If URO display is blank or garbled, replace URO and/or URO cable. (2) If one or more of the 22 display positions do not display an asterisk (*), replace URO.

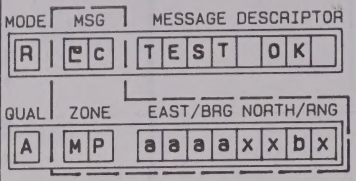
MANPACK UNIT TEST (3 of 7)

Procedure	Normal Indication	Correction Action
2. (cont)	a. (cont)	(3) If one or more of the eight segments that make up each asterisk are missing (see illustration below), replace URO.
		(4) If either or both of the **MSG RCVD** and **OUT OF NET** indicators light, replace URO.
	b. After a 3-second display of all asterisks, **MSG RCVD** and **OUT OF NET** indicators on URO come on and URO displays the following: 	(1) If one or more of the 22 display positions do not display a box (□), replace URO.
		(2) If one or more of the eight segments that make up each box are missing (see illustration below), replace URO.
		(3) If either or both of the **MSG RCVD** and **OUT OF NET** indicators do not light, replace URO.
	c. After a 3-second display of all boxes, **MSG RCVD** and **OUT OF NET** indicators go off and URO displays the following: 	(1) If URO display is blank or garbled, replace URO.
		(2) If URO **MESSAGE DESCRIPTOR** displays **URO PROC**, replace URO.
		(3) If URO **EAST/BRG** and **NORTH/RNG** fields display **PO FAULT**, replace URO.

MANPACK UNIT TEST (4 of 7)

Procedure	Normal Indication	Correction Action
2. (cont)	c. (cont)	(4) If URO **ZONE** field displays a value other than **00**, perform the following: (a) Turn off BUU power and turn back on to reinitialize BUU. (b) Replace URO and repeat test. (c) Replace BUU and repeat test. (d) Replace URO cable. (5) If either or both of **MSG RCVD** and **OUT OF NET** indicators remain lit, replace URO.
	d. After a 6-second display of **URO OK**, URO displays the following for 6 seconds: 	(1) If URO display is blank or garbled, replace URO. (2) If URO **MESSAGE DESCRIPTOR** displays **I/O FAIL**, perform the following: (a) Replace URO and repeat test. (b) Replace URO cable and repeat test. (c) Replace BUU.
	e. **OUT OF NET** indicator blinks until radio set enters the PLRS net and **MSG RCVD** indicator lights to indicate that BUU test status message is available for display on the URO.	

MANPACK UNIT TEST (5 of 7)

Procedure	Normal Indication	Correction Action
3. On URO, press **RCVD** key.	URO displays the following:  • **MP** displayed in **ZONE** field indicates that radio set is a manpack unit. • **aaaa** in the **EAST/BRG** field represents the PLRS ID (BUU serial number) set in the BUU switches. • Display position in **NORTH/RNG** field indicated by **b** displays guard channel switch settings in BUU (normally channel 4, unless otherwise directed). • Displays in display positions indicated by **x** are of no use to organizational maintenance. • Display position in MSG field indicated by c is the variable status as follows: 1 = Current only 3 = Current and next 5 = Rekey and current 7 = Rekey, current, and next	(1) If URO **MESSAGE DESCRIPTOR** displays any of the following, replace BUU. • **FA FAULT** • **BAR FAIL** • **OSC LIM** (2) If URO **MESSAGE DESCRIPTOR** displays **SDU ALRM**, perform the following: (a) Turn off BUU power and then turn back on to reinitialize BUU. (b) Replace BUU. (3) If URO **MESSAGE DESCRIPTOR** displays **NO VAR**, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace keep-alive battery, reload cryptovariables, and repeat test. (c) Replace BUU. (4) If URO **MESSAGE DESCRIPTOR** displays **T VAR NG**, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace BUU.

MANPACK UNIT TEST (6 of 7)

Procedure	Normal Indication	Correction Action
3. (cont)		(5) If URO **MESSAGE DESCRIPTOR** displays **ANT FAIL** or if **ZONE** field displays other than **MP**, perform the following: (a) Check and clean antenna cable connection. (b) Remove antenna from BUU and measure resistance between pin and shell of connector on antenna. Normal resistance is from 14.7 to 17.6 k Ω. • If resistance is not correct, replace antenna. • If resistance is correct, replace BUU. (6) If URO **MESSAGE DESCRIPTOR** displays **BTRY LOW**, and battery was previously replaced, replace BUU. Otherwise, replace battery. (7) If URO **EAST/BRG** field displays a number other than the serial number of the BUU (see BUU nameplate), evacuate BUU to DS for proper setting of PLRS ID switches. (8) If display position in **NORTH/RNG** field indicated by **b** displays incorrect guard channel number, evacuate BUU to DS for proper setting of guard channel switches.

MANPACK UNIT TEST (7 of 7)

Procedure	Normal Indication	Correction Action
4. Observe **OUT OF NET** indicator.	**OUT OF NET** indicator blinks until radio set enters PLRS net then goes out. If PLRS net is available, radio set enters net within 1 minute.	If PLRS net is available and **OUT OF NET** indicator continues to blink after 1 minute, perform the following in the order given, attempting to enter net after each. (a) Reload cryptovariables. (b) Verify that correct cryptovariables are being used. (c) Replace BUU. (d) Replace antenna. (e) Replace antenna cable.
5. After entering PLRS net, send message to request your own position. See TM 11-5825-269-10/TM 08848A-10/2.	Your own position will be received and displayed within 1 minute. See TM 11-5825-269-10/TM 08848A-10/2.	If own position message is not received within 1 minute, replace BUU.

SURFACE VEHICLE UNIT TEST (1 of 10)

Procedure	Normal Indication	Correction Action
1. On BUU front panel, set **POWER** switch to **OFF** then to **ON + AUDIBLE**.	**POWER** indicator comes on and stays on, and **ALARM** indicators comes on for 1 second then goes off. After a delay of 1 to 2 seconds, **OUT OF NET** indicator blinks three times at 3/4-second on and 1/4-second off intervals. Simultaneously, audible alarms on BUU and remote annunciator sound.	(1) If no BUU indicators light or blink, check circuit breaker CB2 on side of SPA and proceed as follows: (a) If circuit breaker CB2 is tripped, perform the following: • Reset circuit breaker and repeat test. • If circuit breaker trips again, remove BUU and reset circuit breaker. • If circuit breaker trips again, replace SPA. • If circuit breaker does not trip, replace BUU. (b) If circuit breaker CB2 is not tripped, perform the following: • Disconnect P1 of power cable from J1 on side of SPA. • Using digital multimeter, measure voltage between pins L(+) and M(-) of P1 on power cable. Normal indication is between 20 and 32 V dc.

NOTE

Radio set can operate with an input voltage as low as 13.5 V dc but power output will be reduced and performance may be degraded.

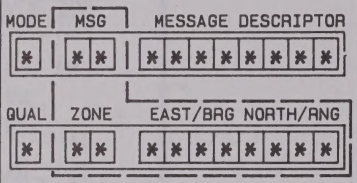
SURFACE VEHICLE UNIT TEST (2 of 10)

Procedure	Normal Indication	Correction Action
1. (cont)		(1) (cont) (b) (cont) • If voltage is absent, check power cable and/or vehicle power source. • If voltage is present, reconnect P1 to J1 on SPA and remove BUU. • Measure voltage between pins 4(+) and 2(-) of J2 on SPA. Normal voltage is from 18.5 to 30.5 V dc with a 20 to 32 V dc input at J1. • If voltage is less than 18.5 V dc with input voltage at P1 20 V dc or greater, or if voltage is absent, replace SPA. • If voltage is normal, proceed with (c) below. (c) Disconnect URO extension cable from **DATA** connector on BUU. If BUU indicator response is still not correct, replace BUU. If indicator response is correct, perform the following in the order listed and repeat test after each. • Replace URO • Replace URO cable • Replace remote annunciator • Replace URO extension cable.

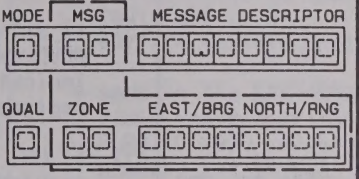
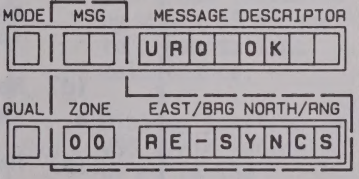
SURFACE VEHICLE UNIT TEST (3 of 10)

Procedure	Normal Indication	Correction Action
1. (cont)		(2) If **POWER** indicator comes on but **ALARM** indicator does not come on for 1 second, replace BUU. (3) If **OUT OF NET** indicator does not blink three times, or if **OUT OF NET** indicator stays on continuously, replace BUU. (4) If audible alarms on BUU and remote annunciator do not sound, or if audible alarm on remote annunciator sounds but audible alarm on BUU does not sound, replace BUU. (5) If audible alarm on BUU sounds but audible alarm on remote annunciator does not sound, perform the following: (a) Check setting of volume control on remote annunciator. (b) Replace remote annunciator and repeat test. (c) Replace URO extension cable. (6) If **ALARM** indicator stays on continuously, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace keep-alive battery, reload cryptovariables, and repeat test.

SURFACE VEHICLE UNIT TEST (4 of 10)

Procedure	Normal Indication	Correction Action
1. (cont)		(6) (cont) (c) Replace BUU. (7) If, after blinking three times with audible alarm accompaniment, **OUT OF NET** indicator blinks once or twice at 1 second on and 1/4 second off accompanied by the audible alarm, replace BUU. These blinks may be followed by one or more 1/8-second blinks accompanied by the audible alarm.
2. Observe display on URO.	a. **MSG RCVD** and **OUT OF NET** indicators on URO remain off and URO displays the following: 	(1) If URO is blank or garbled, perform the following: (a) Replace URO and repeat test. (b) Replace URO cable and repeat test. (c) Replace remote annunciator and repeat test. (d) Replace URO extension cable. (2) If one or more of the 22 display positions do not display an asterisk (*), replace URO. (3) If one or more of the eight segments that make up each asterisk are missing (see illustration below), replace URO.

SURFACE VEHICLE UNIT TEST (5 of 10)

Procedure	Normal Indication	Correction Action
2. (cont)	a. (cont)	(4) If either or both of the **MSG RCVD** and **OUT OF NET** indicators light, replace URO.
	b. After a 3-second display of all asterisks, **MSG RCVD** and **OUT OF NET** indicators on URO come on and URO displays the following: 	(1) If one or more of the 22 display positions do not display a box (□), replace URO. (2) If one or more of the eight segments that make up each box are missing (see illustration below), replace URO. (3) If either or both of the **MSG RCVD** and **OUT OF NET** indicators do not light, replace URO.
	c. After a 3-second display of all boxes, **MSG RCVD** and **OUT OF NET** indicators go off and URO displays the following: 	(1) If URO display is blank or garbled, replace URO. (2) If URO **MESSAGE DESCRIPTOR** displays **URO PROC**, replace URO. (3) If URO **EAST/BRG** and **NORTH/RNG** fields display **PO FAULT**, replace URO. (4) If URO **ZONE** field displays a value other than **00**, perform the following: (a) Turn off BUU power and turn back on to reinitialize BUU. (b) Replace URO and repeat test. (c) Replace BUU and repeat test.

SURFACE VEHICLE UNIT TEST (8 of 10)

Procedure	Normal Indication	Correction Action
3. (cont)		(5) If URO **MESSAGE DESCRIPTOR** displays **ANT FAIL** or if **ZONE** field displays other than **SV**, perform the following: (a) Check and clean antenna cable connections. (b) Disconnect P1 of antenna cable from **ANT.** connector on BUU and perform the following: • Measure resistance between pin and shell of antenna cable connector P1. Normal resistance is from 6.77 to 8.25 kΩ. • If resistance is correct, replace BUU. • If resistance is incorrect, perform (c) below. (c) Disconnect P2 of antenna cable from antenna base and measure resistance between pin and shell of connector on antenna base. Normal resistance is the same as in (b) above. • If resistance is correct, replace antenna cable. • If resistance is incorrect, replace antenna.

SURFACE VEHICLE UNIT TEST (9 of 10)

Procedure	Normal Indication	Correction Action
		NOTE The URO **MESSAGE DESCRIPTOR** may indicate **BTRY LOW** when the SVU input voltage is within its normal range. The **BTRY LOW** indication is used primarily for user units that employ battery power. The low battery indication threshold is set to 20.75 ±0.5 V dc in order to signal the operator that the battery will need replacing soon. The SVU input voltage from the vehicle can range from 20 V to 32 V dc. This produces an input voltage at the BUU between 18.5 and 30.5 V dc. When the SVU input voltage is 22.5 ±0.5 V dc, or less, the **MESSAGE DESCRIPTOR** will display **BTRY LOW** even though the input voltage is within the normal range.
3. (cont)		(6) If URO **MESSAGE DESCRIPTOR** displays **BTRY LOW**, perform the following: (a) Disconnect P1 of power cable from J1 on SPA. (b) Measure voltage between pins L(+) and M(-) of P1. • If voltage is less than 22.5 ±0.5 V dc, but equal to or greater than 20 V dc, indication is normal and no fault exists. • If voltage is greater than 22.5 ±0.5 V dc, proceed to (c) below. (c) Reconnect P1 to J1 on SPA, remove BUU, and measure voltage between pins 4(+) and 2(-) of J2 on SPA. • If voltage is less than 21 V dc, replace SPA. • If voltage is greater than 21 V dc, replace BUU.

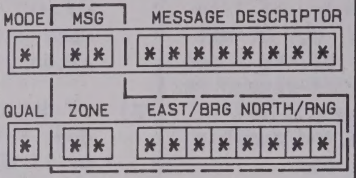
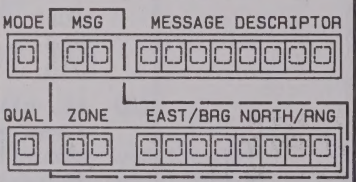
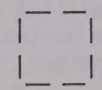
SURFACE VEHICLE UNIT TEST (10 of 10)

Procedure	Normal Indication	Correction Action
3. (cont)		(7) If URO **EAST/BRG** displays a number other than the serial number of the BUU (see BUU nameplate) evacuate BUU to DS for proper setting of PLRS ID switches. (8) If display position in **NORTH/RNG** field indicated by **b** displays incorrect guard channel number, evacuate BUU to DS for proper setting of guard channel switches.
4. Observe **OUT OF NET** indicator.	**OUT OF NET** indicator blinks until radio set enters PLRS net then goes out. When PLRS net is available, radio set enters net within 1 minute.	If PLRS net is available and **OUT OF NET** indicator continues to blink after 1 minute, perform the following, attempting to enter net after each. (a) Reload cryptovariables (b) Verify that correct variables are being used. (c) Replace BUU. (d) Replace antenna. (e) Replace antenna cable.
5. After entering PLRS net, send message to request your own position. See TM 11-5825-269-10/ TM 08848A-10/2.	Your own position will be received within 1 minute. See TM 11-5825-269-10/TM 08848A-10/2.	If own position message is not received within 1 minute, replace BUU.

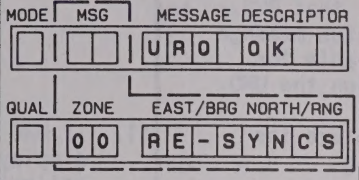
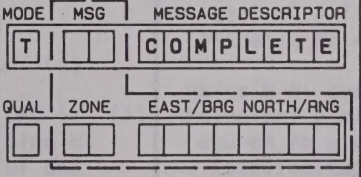
AUXILIARY GROUND UNIT TEST (1 of 8)

Procedure	Normal Indication	Correction Action
1. On BUU front panel, set **POWER** switch to **OFF** then to **ON + AUDIBLE**.	**POWER** indicator comes on and stays on, and **ALARM** indicator comes on for 1 second then goes off. After a delay of 1 to 2 seconds, **OUT OF NET** indicator blinks three times at 3/4-second on and 1/4-second off intervals and audible alarm sounds simultaneously.	(1) If no BUU indicators light or blink, perform AGU power troubleshooting according to procedure on page 2-39. (2) If **POWER** indicator comes on but **ALARM** indicator does not come on for 1 second, replace BUU. (3) If **OUT OF NET** indicator does not blink three times, or if **OUT OF NET** indicator stays on continuously, replace BUU. (4) If audible alarm does not sound, replace BUU. (5) If **ALARM** indicator stays on continuously, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace keep-alive battery, reload cryptovariables, and repeat test. (c) Replace BUU. (6) If, after blinking three times with audible alarm accompaniment, **OUT OF NET** indicator blinks once or twice at 1 second on and 1/4 second off accompanied by the audible alarm, replace BUU. These blinks may be followed by one or more 1/8-second blinks accompanied by the audible alarm.

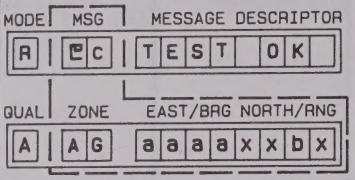
AUXILIARY GROUND UNIT TEST (2 of 8)

Procedure	Normal Indication	Correction Action
2. Observe display on URO.	a. **MSG RCVD** and **OUT OF NET** indicators on URO remain off and URO displays the following for 3 seconds: 	(1) If URO display is blank or garbled, replace URO and/or URO cable. (2) If one or more of the 22 display positions do not display an asterisk (*), replace URO. (3) If one or more of the eight segments that make up each asterisk are missing (see illustration below), replace URO. (4) If either or both of the **MSG RCVD** and **OUT OF NET** indicators light, replace URO.
	b. **MSG RCVD** and **OUT OF NET** indicators on URO come on and URO displays the following for 3 seconds: 	(1) If one or more of the 22 display positions do not display a box (□), replace URO. (2) If one or more of the eight segments that make up each box are missing (see illustration below), replace URO.  (3) If either or both of the **MSG RCVD** and **OUT OF NET** indicators do not light, replace URO.

AUXILIARY GROUND UNIT TEST (3 of 8)

Procedure	Normal Indication	Correction Action
2. (cont)	c. **MSG RCVD** and **OUT OF NET** indicators on URO go off and URO displays the following: 	(1) If URO display is blank or garbled, replace URO. (2) If URO **MESSAGE DESCRIPTOR** displays **URO PROC**, replace URO. (3) If URO **EAST/BRG** and **NORTH/ RNG** fields display **PO FAULT**, replace URO. (4) If URO **ZONE** field displays a value other than **00**, perform the following: (a) Turn off BUU power and turn back on to reinitialize BUU. (b) Replace URO and repeat test. (c) Replace BUU and repeat test. (d) Replace URO cable. (5) If either or both of **MSG RCVD** and **OUT OF NET** indicators remain lit, replace URO.
	d. After a 6-second display of **URO OK**, URO displays the following for 6 seconds: 	(1) If URO display is blank or garbled, replace URO. (2) If URO **MESSAGE DESCRIPTOR** displays **I/O FAIL**, perform the following: (a) Replace URO and repeat test. (b) Replace URO cable and repeat test. (c) Replace BUU.

AUXILIARY GROUND UNIT TEST (4 of 8)

Procedure	Normal Indication	Correction Action
2. (cont)	e. **OUT OF NET** indicator blinks until radio set enters the PLRS net and **MSG RCVD** indicator lights to indicate that BUU test status message is available for display on the URO.	
3. On URO, press **RCVD** key.	URO displays the following:  • **AG** displayed in **ZONE** field indicates that radio set is an auxiliary ground unit. • **aaaa** in the **EAST/BRG** field represents the PLRS ID (BUU serial number) set in the BUU switches. • Display position in **NORTH/RNG** field indicated by **b** displays guard channel switch settings in BUU, (normally channel 4, unless otherwise directed). • Displays in display positions indicated by **x** are of no use to organizational maintenance. • Display positions in **MSG** field indicated by **Ec** is the variable status as follows.	(1) If URO **MESSAGE DESCRIPTOR** displays any of the following, replace BUU. • **FA FAULT** • **BAR FAIL** • **OSC LIM** (2) If URO **MESSAGE DESCRIPTOR** displays **SDU ALRM**, perform the following: (a) Turn off BUU power and then turn back on to reinitialize BUU. (b) Replace BUU. (3) If URO **MESSAGE DESCRIPTOR** displays **NO VAR**, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace keep-alive battery, reload cryptovariables, and repeat test. (c) Replace BUU. (4) If URO **MESSAGE DESCRIPTOR** displays **T VAR NG**, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace BUU.

AUXILIARY GROUND UNIT TEST (5 of 8)

Procedure	Normal Indication	Correction Action
3. (cont)	℡ 1 = Current only ℡ 3 = Current and next ℡ 5 = Rekey and current ℡ 7 = Rekey, current, and next	(5) If URO **MESSAGE DESCRIPTOR** displays **ANT FAIL** or if **ZONE** field displays other than **AG**, perform the following: (a) Check and clean antenna cable connections. (b) Disconnect P1 of antenna cable from **ANT.** connector on BUU and perform the following: • Measure resistance between pin and shell of antenna cable connector P1. Normal resistance is from 2.4 to 3.0 kΩ. • If resistance is correct, replace BUU. • If resistance is not correct, perform (c) below. (c) Disconnect P2 of antenna cable from antenna and measure resistance between pin and shell of connector on antenna. Normal resistance is the same as in (b) above. • If resistance is correct, replace antenna cable. • If resistance is incorrect, replace antenna.

AUXILIARY GROUND UNIT TEST (6 of 8)

Procedure	Normal Indication	Correction Action
	NOTE	
The **BTRY LOW** indication on the URO is intended as a battery low indication for manpack units. In other types of installations, the **BTRY LOW** indication may be obtained even though the input voltage is within normal range. For example, in the AGU using the battery case, the **BTRY LOW** indication will appear when the battery case output voltage drops below 22.25 V dc, whereas the batteries are usable down to 19.75 V dc. In manpack units, the **BTRY LOW** indication does not appear until the battery voltage drops to 20.75 V dc.		
3. (cont)		(6) If URO **MESSAGE DESCRIPTOR** displays **BTRY LOW**, perform the following: (a) Disconnect P1 of power cable from J1 on side of SPA. (b) Using digital multimeter, measure voltage between pins L(+) and M(-) for dc power from external source or battery case. Measure ac voltage between pins C and G. • Voltage from external dc power source should be 20 to 32 V dc. • Voltage from battery case should be 19.75 to 30.5 V dc. • Voltage from ac source should be 108 to 132 V ac. (c) If dc voltage is less than 22 V but greater than 20 V, indication is normal and no voltage problem exists.

AUXILIARY GROUND UNIT TEST (7 of 8)

Procedure	Normal Indication	Correction Action
3. (cont)		(6) (cont) (d) If voltage is less than 20 V dc and battery case is being used, replace batteries. (e) If dc voltage is greater than 22.5 V or ac voltage is greater than 108 V, perform the following: • Reconnect power cable to J1 on SPA. • Remove BUU. • Using digital multimeter, measure dc voltage between pins 4(+) and 2(-) of J2 on front of SPA. • If voltage is less than 21 V dc, replace SPA. • If voltage is greater then 21 V dc, replace BUU. (7) If URO **EAST/BRG** field displays a number other than the serial number of the BUU (see BUU nameplate), evacuate BUU to DS for proper setting of PLRS ID switches. (8) If display position in **NORTH/RNG** field indicated by b displays incorrect guard channel number, evacuate BUU to DS for proper setting of guard channel switches.

AUXILIARY GROUND UNIT TEST (8 of 8)

Procedure	Normal Indication	Correction Action
4. Observe **OUT OF NET** indicator.	**OUT OF NET** indicator blinks until radio set enters PLRS net then goes out. If PLRS net is available, radio set enters net within 1 minute.	If PLRS net is available and **OUT OF NET** indicator continues to blink after 1 minute, perform the following in the order given, attempting to enter net after each. (a) Reload cryptovariables. (b) Verify that correct cryptovariables are being used. (c) Replace BUU. (d) Replace antenna. (e) Replace antenna cable.
5. After entering PLRS net, send message to request your own position. See TM 11-5825-269-10/TM 08848A-10/2.	Your own position will be received and displayed within 1 minute. See TM 11-5825-269-10/ TM 08848A-10/2.	If own position message is not received within 1 minute, replace BUU.

AUXILIARY GROUND UNIT POWER TROUBLESHOOTING (1 of 5)

Power for the auxiliary ground unit can be supplied by one of three types of power sources: Battery Case CY-7872/GRC-210, an external 20 to 32 V dc source, or an external 120 V 60 Hz source. Because fault location for each type of power source differs, each has a separate power fault isolation procedure. A power fault is indicated if none of the indicators on the BUU front panel light or flash when the BUU POWER switch is set to the ON position.

POWER FAULT ISOLATION PROCEDURE FOR BATTERY CASE POWER SOURCE

Procedure	Corrective Action
1. Check circuit breaker CB2 on SPA.	(1) If circuit breaker is on, go to step 2. (2) If circuit breaker is tripped, perform the following: (a) Reset circuit breaker CB2. (b) If circuit breaker trips, remove BUU and reset circuit breaker CB2. (c) If circuit breaker does not trip, replace BUU. If circuit breaker trips again, replace SPA.
2. Check circuit breaker CB1 on battery case.	(1) If circuit breaker is on, go to step 3. (2) If circuit breaker is tripped, perform the following: (a) Reset circuit breaker. (b) If circuit breaker trips again, disconnect power cable connector from J1 on battery case and reset circuit breaker. (c) If circuit breaker trips again, replace battery case.

AUXILIARY GROUND UNIT POWER TROUBLESHOOTING (2 of 5)

POWER FAULT ISOLATION PROCEDURE FOR BATTERY CASE POWER SOURCE (cont)

Procedure	Corrective Action
2. (cont)	(2) (cont) (d) If circuit breaker does not trip, reconnect power cable connector to J1 on battery case and disconnect power cable connector from J1 on SPA. Reset circuit breaker. (e) If circuit breaker trips again, replace power cable. (f) If circuit breaker does not trip again, replace SPA.

WARNING

Lithium organic batteries are used in this equipment. They are potentially hazardous if misused or tampered with before, during, or after discharge. The following precautions must be strictly observed to prevent possible injury to personnel or damage to equipment:

DO NOT heat, incinerate, crush, puncture, disassemble, or otherwise mutilate the batteries.

DO NOT short circuit or recharge battery or bypass internal fuse.

DO NOT store batteries in equipment during period of nonuse in excess of 30 days.

TURN OFF the equipment immediately if you detect battery case becoming unduly hot, hear battery cells venting (hissing sound), or smell irritating sulphur dioxide gas. Remove and dispose of battery only after it is cool (30 - 60 minutes).

CAUTION

Each battery is fused in each 12-volt section of the battery. Inadvertent or deliberate shorting of the battery terminals will blow the fuse and make the battery inoperable. In no case shall an attempt be made to bypass the fuse.

AUXILIARY GROUND UNIT POWER TROUBLESHOOTING (3 of 5)

POWER FAULT ISOLATION PROCEDURE FOR BATTERY CASE POWER SOURCE (cont)

Procedure	Corrective Action
3. Disconnect P2 of power cable from J1 on SPA and using digital multimeter measure voltage between pins L(+) and M(–) of P2. Voltage should be from 19.5 to 30.5 V dc.	(1) If voltage is absent, proceed as follows: (a) Disconnect P1 of power cable from J1 on battery case. (b) Using digital multimeter, measure dc voltage between pins L(+) and M(–) of J1 on battery case. • If voltage is present, replace power cable. • If voltage is absent, replace at least one battery in battery case and measure voltage between pins L and M again. If voltage is now present, replace remaining batteries in battery case. If voltage is still absent, replace battery case. (2) If voltage is present, proceed as follows: (a) Reconnect P2 of power cable to J1 on SPA and remove BUU. (b) Using digital multimeter, measure dc voltage between pins 4(+) and 2(–) of J2 on front of SPA. This voltage should be between 18.5 and 29 V dc. • If voltage is normal, replace BUU. • If voltage is low or absent, replace SPA.

AUXILIARY GROUND UNIT POWER TROUBLESHOOTING (4 of 5)

POWER FAULT ISOLATION PROCEDURE FOR EXTERNAL DC SOURCE

Procedure	Corrective Action
1. Check circuit breaker CB2 on SPA.	(1) If circuit breaker is on, go to step 2. (2) If circuit breaker is tripped, perform the following: (a) Reset circuit breaker CB2. (b) If circuit breaker trips again, remove BUU and reset circuit breaker. • If circuit breaker trips again, replace SPA. • If circuit breaker does not trip again, replace BUU.
2. Disconnect power cable connector P1 from J1 on SPA and using digital multimeter, measure dc voltage between pins L(+) and M(–) of P1. Voltage should be between 20 and 32 V dc.	(1) If voltage is absent or low, check dc power cable and/or dc source. (2) If voltage is normal, reconnect P1 of power cable to J1 on SPA and proceed as follows: (a) Remove BUU. (b) Using digital multimeter, measure dc voltage between pins 4(+) and 2(–) of J2 on front of SPA. This voltage should be between 18.5 and 30.5 V dc. • If voltage is normal, replace BUU. • If voltage is low or absent, replace SPA.

POWER FAULT ISOLATION PROCEDURE FOR EXTERNAL AC SOURCE

Procedure	Corrective Action
1. Check circuit breaker CB1 on SPA.	(1) If circuit breaker is on, go to step 2. (2) If circuit breaker is tripped, perform the following:

AUXILIARY GROUND UNIT POWER TROUBLESHOOTING (5 of 5)

POWER FAULT ISOLATION PROCEDURE FOR EXTERNAL AC SOURCE (cont)

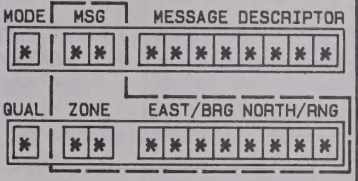
Procedure	Corrective Action
1. (cont)	(2) (cont) (a) Reset circuit breaker CB1. (b) If circuit breaker trips again, remove BUU and reset circuit breaker. • If circuit breaker trips again, replace SPA. • If circuit breaker does not trip again, replace BUU.
2. Disconnect ac power cable connector P1 from J1 on SPA and using digital multimeter measure ac voltage between pins C and G on connector P1. Voltage should be between 108 and 132 V ac.	(1) If voltage is low or absent, check ac power cord and/or ac power source. (2) If voltage is normal, reconnect P1 of ac power cable to J1 on SPA and perform the following: (a) Remove BUU. (b) Using digital multimeter, measure dc voltage between pins 4(+) and 2(–) of J2 on front of SPA. This voltage should be between 18.5 and 30.5 V dc. • If voltage is normal, replace BUU. • If voltage is low or absent, replace SPA.

AIRBORNE UNIT TEST (1 of 9)

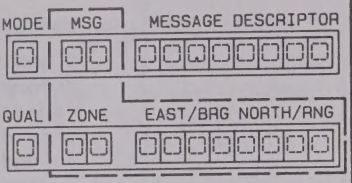
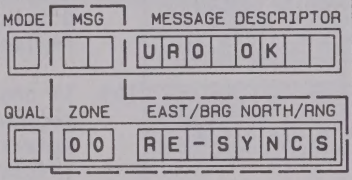
At the aviation unit maintenance (AVUM) level, all fault isolation is accomplished by using the built-in self-test of the radio set. This built-in test consists of two parts; the BUU test and the PCDP test. Both tests are initiated automatically when power is turned on. Faults are isolated to replaceable major assemblies, power distribution, and/or interconnecting cables. When faults are isolated to power distribution, a digital multimeter is used to make voltage and/or resistance measurements to further isolate the fault. The power distribution faults are further isolated to a replaceable major assembly, the aircraft power source, or an interconnecting cable. Faults are corrected by replacement of replaceable major assemblies and/or repair or replacement of interconnecting cables.

Procedure	Normal Indication	Corrective Action
1. On PCDP, set **POWER** switch to **ON** and on BUU front panel, set **POWER** switch to **OFF** then to **ON + AUDIBLE**.	**POWER** indicator on BUU front panel comes on and stays on, panel illumination on PCDP comes on, and **ALARM** indicator comes on for 1 second, then goes off. After a delay of 1 to 2 seconds, **OUT OF NET** indicator on BUU front panel blinks three times at 3/4-second on and 1/4-second off intervals, and audible alarm sounds simultaneously.	(1) If no indicators on BUU front panel light or blink, set **BRT** control on PCDP to mid-position, verify that aircraft panel lighting is on, and check PCDP for panel illumination. (a) If there is no panel illumination on PCDP, perform power fault isolation beginning on page 2-53. (b) If PCDP panel lights, replace BUU. (2) If **POWER** indicator on BUU comes on but **ALARM** indicator does not come on for 1 second, replace BUU. (3) If **OUT OF NET** indicator does not blink three times, or if **OUT OF NET** indicator stays on continuously, replace BUU. (4) If audible alarm does not sound, replace BUU. (5) If **ALARM** indicator on BUU stays on continuously, perform the following: (a) Reload cryptovariables and repeat test.

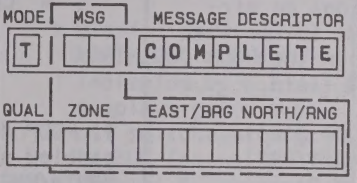
AIRBORNE UNIT TEST (2 of 9)

Procedure	Normal Indication	Correction Action
1. (cont)		(5) (cont) (b) Replace keep-alive battery, reload cryptovariables, and repeat test. (c) Replace BUU. (6) If after blinking three times with audible alarm accompaniment, **OUT OF NET** indicator on BUU blinks once or twice at 1 second on and 1/4 second off accompanied by the audible alarm, replace BUU. These blinks may be followed by one or more 1/8-second blinks accompanied by the audible alarm.
2. Observe display on PCDP.	a. **MSG RCVD** and **OUT OF NET** indicators on PCDP remain off and PCDP displays the following: 	(1) If PCDP display is blank or garbled, replace PCDP and/or check signal cable. (2) If one or more of the 22 display positions do not display an asterisk (*), replace PCDP. (3) If one or more of the eight segments that make up each asterisk are missing (see illustration below), replace PCDP. (4) If either or both of the **MSG RCVD** and **OUT OF NET** indicators light, replace PCDP.

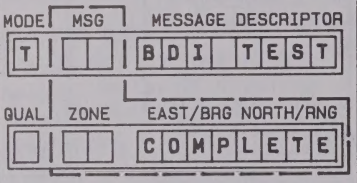
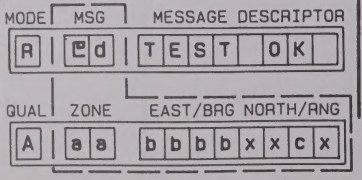
AIRBORNE UNIT TEST (3 of 9)

Procedure	Normal Indication	Correction Action
2. (cont)	b. After a 3-second display of all asterisks, **MSG RCVD** and **OUT OF NET** indicators on PCDP come on and PCDP displays the following: 	(1) If one or more of the 22 display positions do not display a box (□), replace PCDP. (2) If one or more of the eight segments that make up each box are missing (see illustration below), replace PCDP. (3) If either or both of the **MSG RCVD** and **OUT OF NET** indicators do not light, replace PCDP.
	c. After a 3-second display of all boxes, **MSG RCVD** and **OUT OF NET** indicators go off and PCDP displays the following: 	(1) If PCDP display is blank or garbled, replace PCDP. (2) If PCDP **MESSAGE DESCRIPTOR** displays **URO PROC**, replace PCDP. (3) If PCDP **EAST/BRG** and **NORTH/RNG** fields display **PO FAULT**, replace PCDP. (4) If PCDP **ZONE** field displays a value other than **00**, perform the following: (a) Turn off BUU power and turn back on to reinitialize BUU. (b) Replace PCDP and repeat test. (c) Replace BUU and repeat test. (d) Check signal cable.

AIRBORNE UNIT TEST (4 of 9)

Procedure	Normal Indication	Correction Action
2. (cont)	c. (cont)	(5) If either or both of **MSG RCVD** and **OUT OF NET** indicators remain lit, replace PCDP.
	d. After a 6-second display of **URO OK**, PCDP displays the following for 6 seconds: 	(1) If PCDP display is blank or garbled, replace PCDP. (2) If PCDP **MESSAGE DESCRIPTOR** displays **I/O FAIL**, perform the following: (a) Replace PCDP and repeat test. (b) Replace BUU and repeat test. (c) Check signal cable.
3. Observe display on PCDP and observe indication on aircraft BDI.	a. After a 6-second display of **T COMPLETE**, PCDP displays the following: • **aaa** in **EAST/BRG** field equals bearing in degrees that starts at 000 and increments in 15-degree steps every 3 seconds.	(1) If PCDP display is blank or garbled, replace PCDP. (2) If PCDP **EAST/BRG** field does not start at 000 and increment in 15-degree steps every 15 seconds, and/or if **NORTH/RNG** field does not start at 1 and increment in synchronism with **EAST/BRG** field, replace PCDP. (3) If aircraft BDI indications do not follow bearings indicated on PCDP, perform the following: • Verify that aircraft heading reference system is on.

AIRBORNE UNIT TEST (5 of 9)

Procedure	Normal Indication	Correction Action
3. (cont)	a. (cont) • **bb** in **NORTH/RNG** field is a decimal count that starts at 01 and increments one count each time the **EAST/BRG** field increments a 15-degree step. Indications on aircraft BDI follow the display in the PCDP **EAST/BRG** field.	(3) (cont) • Replace PCDP and repeat test. • Replace BDI and repeat test. • Check synchro reference voltage supplied to PCDP. See reference diagram on page 2-56. • Check BDI cable.
	b. After PCDP displays **345** in **EAST/BRG** field and **24** in **NORTH/RNG** field, PCDP displays the following: 	If PCDP display is blank or garbled or if **EAST/BRG** and **NORTH/RNG** fields do not display **COMPLETE**, replace PCDP.
	c. **OUT OF NET** indicator blinks until radio set enters the PLRS net and **MSG RCVD** indicator lights to indicate that BUU test status message is available for display on the PCDP.	
4. On PCDP, press **RCVD** key.	PCDP displays the following: 	(1) If PCDP **MESSAGE DESCRIPTOR** displays any of the following, replace BUU. • **FA FAULT** • **BAR FAIL** • **OSC LIM**

AIRBORNE UNIT TEST (6 of 9)

Procedure	Normal Indication	Correction Action
4. (cont)	• **aa** in the **ZONE** field is **AR** for a rotary wing or **AF** for a fixed wing aircraft. • **bbbb** in the **EAST/BRG** field represents the PLRS ID (BUU serial number) set in the BUU switches. • Display position in **NORTH/RNG** field indicated by **c** displays guard channel switch settings in BUU (normally channel 4, unless otherwise directed). • Displays in display positions indicated by **x** are of no use to AVUM. • Display positions in MSG field indicated by d is the variable status as follows: 1 = Current only 3 = Current and next 5 = Rekey and current 7 = Rekey, current, and next	(2) If PCDP **MESSAGE DESCRIPTOR** displays **SDU ALRM**, perform the following: (a) Turn off BUU power and then turn back on to reinitialize BUU. (b) Replace BUU. (3) If PCDP **MESSAGE DESCRIPTOR** displays **NO VAR**, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace keep-alive battery, reload cryptovariables, and repeat test. (c) Replace BUU. (4) If PCDP **MESSAGE DESCRIPTOR** displays **T VAR NG**, perform the following: (a) Reload cryptovariables and repeat test. (b) Replace BUU. (5) If PCDP **MESSAGE DESCRIPTOR** displays **ANT FAIL** or if **ZONE** field displays other than **AR** for rotary wing aircraft or **AF** for fixed wing aircraft, perform the following: (a) Check and clean antenna cable connections.

AIRBORNE UNIT TEST (7 of 9)

Procedure	Normal Indication	Correction Action
4. (cont)		(5) (cont) (b) Disconnect P1 of antenna cable from ANT. connector on BUU and perform the following: • Measure resistance between pin and shell of antenna cable connector P1. Normal resistance is from 14.6 to 17.6 kΩ for rotary wing aircraft or from 2.4 to 3.0 kΩ for fixed wing aircraft. • If resistance is correct, replace BUU. • If resistance is incorrect perform (c) below. (c) Disconnect P2 of antenna cable from antenna base and measure resistance between pin and shell of connector on antenna base. Normal resistance is the same as in (b) above. • If resistance is correct, repair or replace antenna cable. • If resistance is incorrect, replace antenna.

AIRBORNE UNIT TEST (8 of 9)

Procedure	Normal Indication	Correction Action

NOTE

The PCDP **MESSAGE DESCRIPTOR** may indicate **BTRY LOW** when the airborne unit input voltage is within its normal range. The **BTRY LOW** indication is used primarily for user units that employ battery power. The low battery indication threshold is set to 20.75 ±0.5 V dc in order to signal the operator that the battery will need replacing soon. The airborne unit input voltage from the aircraft can range from 22.5 V to 30 V dc. This produces an input voltage at the BUU between 18.5 and 30 V dc. When the airborne unit input voltage is 22.5 ±0.5 V dc, or less, the **MESSAGE DESCRIPTOR** will display **BTRY LOW** even though the input voltage is within the normal range.

4. (cont)		(6) If PCDP **MESSAGE DESCRIPTOR** displays **BTRY LOW**, perform the following: (a) Disconnect P1 of power cable from J1 on APA. (b) Measure voltage between pins L(+) and M(-) of P1. • If voltage is 22.5 ±0.5 V dc, indication is normal and no fault exists. • If voltage is greater than 22.5 ±0.5 V dc, proceed to (c) below. (c) Reconnect P1 to J1 on APA, remove BUU, and measure voltage between pins 4(+) and 2(-) of J2 on APA. • If voltage is less than 21 V dc, replace APA. • If voltage is greater than 21 V dc, replace BUU.

AIRBORNE UNIT TEST (9 of 9)

Procedure	Normal Indication	Correction Action
4. (cont)		(7) If PCDP **EAST/BRG** displays a number other than the serial number of the BUU (see BUU nameplate), evacuate BUU to AVIM for proper setting of PLRS ID switches. (8) If display position in **NORTH/RNG** field indicated by **c** displays incorrect guard channel, evacuate BUU to AVIM for proper setting of guard channel switches.
5. Observe **OUT OF NET** indicator.	**OUT OF NET** indicator blinks until radio set enters PLRS net then goes out. When PLRS net is available, radio set enters net within 1 minute.	If PLRS net is available and **OUT OF NET** indicator continues to blink after 1 minute, perform the following, attempting to enter net after each. (a) Reload cryptovariables (b) Verify that correct variables are being used. (c) Replace BUU. (d) Replace antenna. (e) Repair or replace antenna cable.
6. After entering PLRS net, send message to request your own position. See TM 11-5825-269-10/ TM 08848A-10/2.	Your own position will be received within 1 minute. See TM 11-5825-269-10/TM 08848A-10/2.	If own position message is not received within 1 minute, replace BUU.

AIRBORNE UNIT POWER TROUBLESHOOTING (1 of 3)

Symptom	Corrective Action
POWER indicator on BUU does not light and no panel illumination or displays on PCDP.	1. Verify that **POWER** switches on BUU and PCDP are both on. 2. Verify that aircraft PLRS circuit breakers are on. 3. Disconnect power cable connector P1 from J1 on APA and using digital multimeter, measure dc voltage between pins A (+) and C (–) and/or B (+) and D (–) of P1. This voltage should be between 22.5 and 30 V dc. a. If correct voltage is present, proceed to step 4. b. If voltage is absent, check aircraft dc source and/or power cable. 4. Disconnect signal cable connector P2 from A2J1 on APA and using digital multimeter, check for continuity between pins A and D of P2. With the **POWER** switch on PCDP set to **ON**, continuity should be indicated between pins A and D. a. If continuity is indicated, replace APA. b. If open circuit or high resistance is indicated, disconnect P3 from J1 on PCDP and check for continuity between U and Z of J1 on PCDP. • If continuity is indicated, check signal cable. • If open circuit or high resistance is indicated, replace PCDP.
Indicators on BUU light but no displays or panel illumination on PCDP.	1. Verify that **BRT** (brightness) control on PCDP is not fully clockwise. 2. Disconnect signal cable connector P1 from **DATA** connector J3 on BUU front panel and using digital multimeter check for 5 V dc between pins C (+) and U (–) of J3. a. If 5 V dc is present, proceed to step 3. b. If voltage is absent, replace BUU. 3. Replace PCDP. 4. Replace APA.

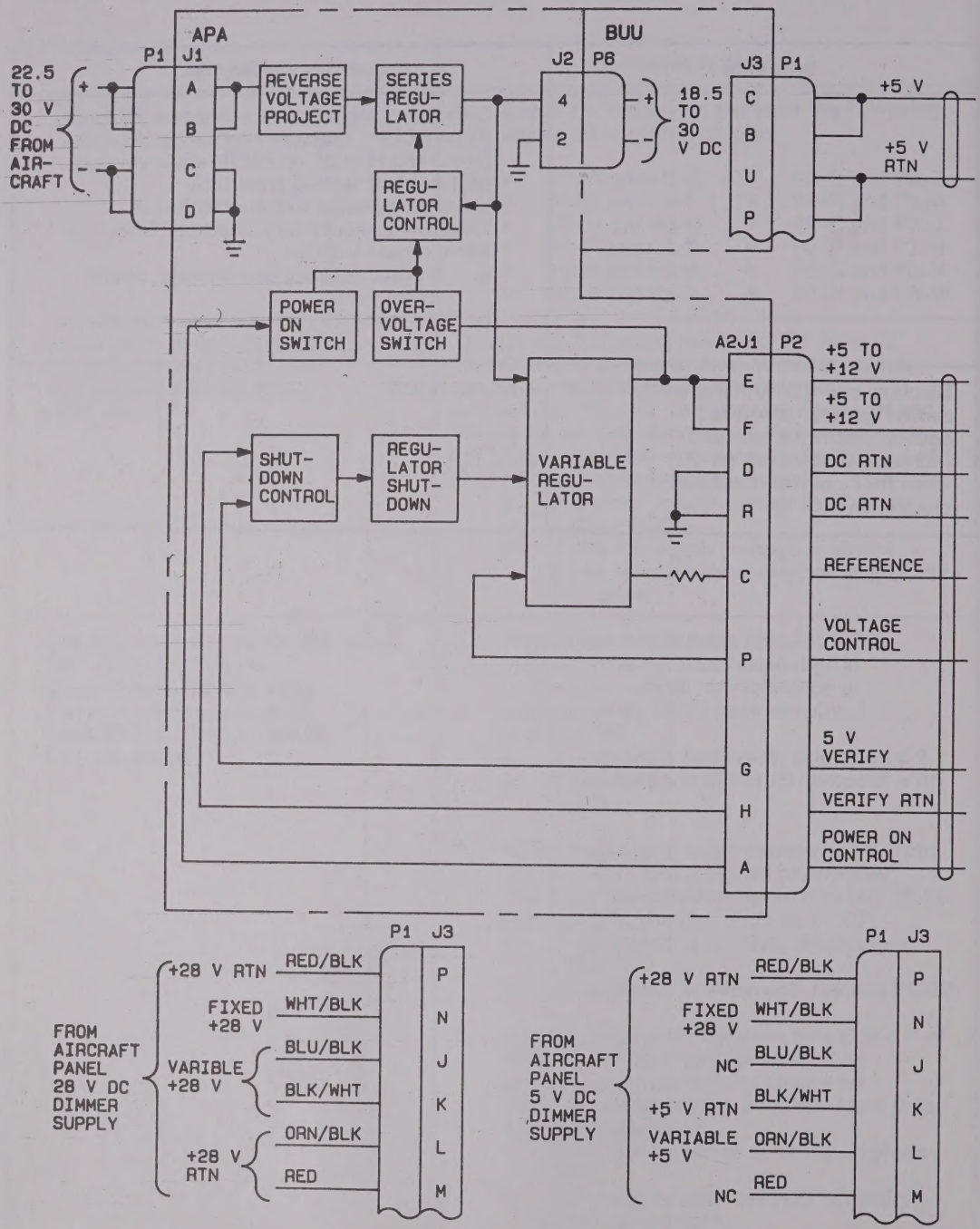
AIRBORNE UNIT POWER TROUBLESHOOTING (2 of 3)

Symptom	Corrective Action
	5. Check for continuity between the following signal cable connector pins: • P1-C and P3-E • P1-B and P3-E • P1-U and P3-D • P1-P and P3-D • P2-E and P3-B • P2-F and P3-S • P2-D and P3-Z • P2-R and P3-A • P2-C and P3-J • P2-P and P3-H • P2-G and P3-V • P2-H and P3-W
No panel illumination on PCDP, but indicators on BUU light and displays are obtained on PCDP.	Disconnect BDI cable connector P1 from J3 on PCDP and using digital multimeter, check for 5 V dc dimmer supply between pins L (+) and N (-) of P1, if 5-volt dimmer supply is used. Check for 28 V dc dimmer supply between pins J (+) and L (-) and between pins K (+) and M (-) of P1, if 28-volt dimmer supply is used. a. If dimmer supply voltage is present, replace PCDP. b. If dimmer supply voltage is absent, check aircraft panel dimmer supply and BDI cable.
Displays on PCDP do not dim when **BRT** control is rotated counterclockwise and panel illumination does not go off when **BRT** control is rotated fully clockwise.	1. Disconnect signal cable connector P2 from A2J1 on SPA and using digital multimeter, check for resistance of approximately 26 kΩ between pins J and R of P2. a. If resistance is correct, skip to step 3. b. If resistance is incorrect, proceed with step 2. 2. Disconnect signal cable connector P3 from J1 on PCDP. Using digital multimeter, check for resistance of approximately 26 kΩ between pins J and A of J1 on PCDP. a. If resistance is correct, check signal cable. b. If resistance is incorrect, replace PCDP. 3. Measure resistance between pins C and P of P2 and vary **BRT** control from fully counterclockwise to fully clockwise. Resistance should vary smoothly from 0 to approximately 25 kΩ. a. If resistance varies normally, replace APA. b. If resistance does not vary normally, proceed to step 4.

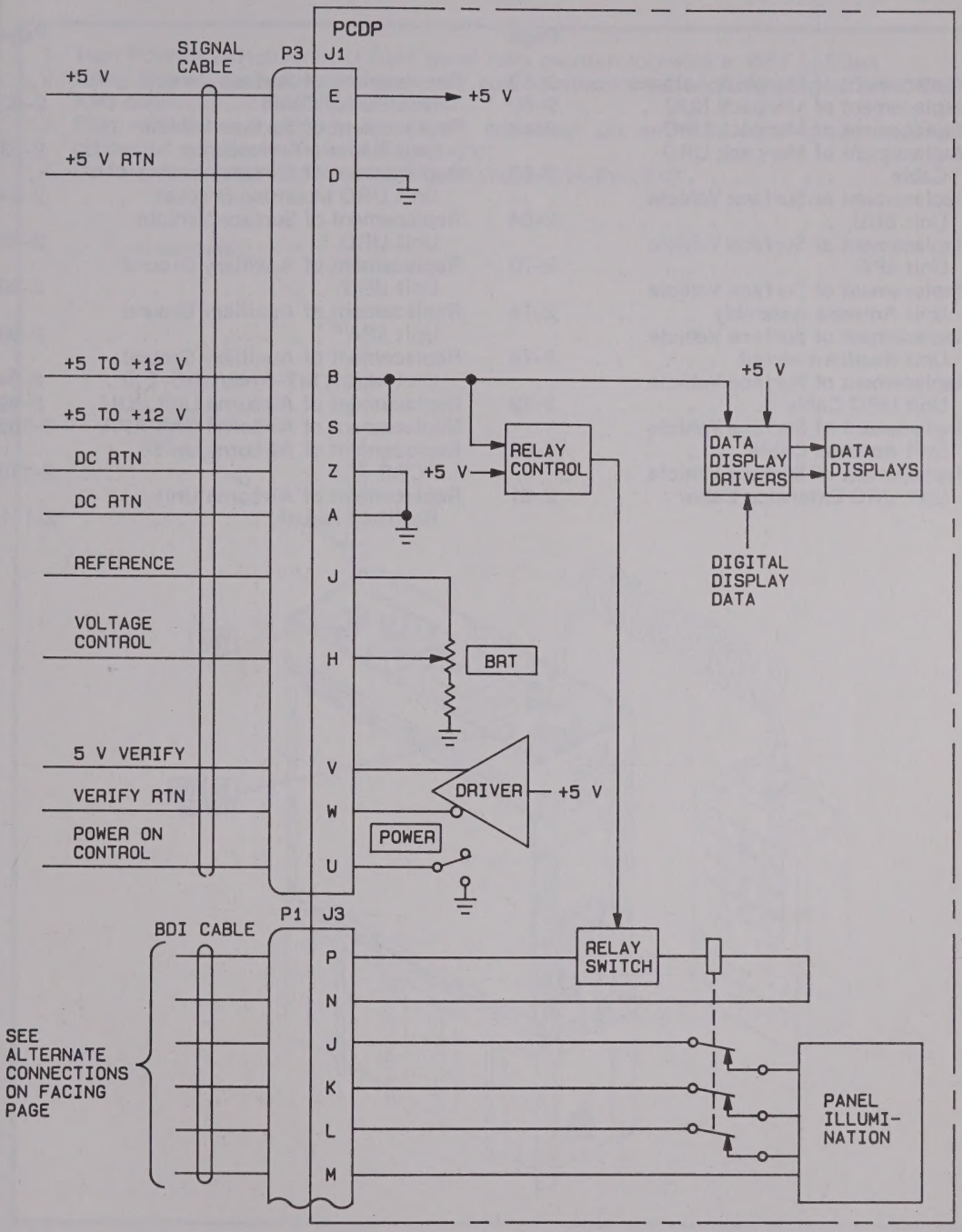
AIRBORNE UNIT POWER TROUBLESHOOTING (3 of 3)

Symptom	Corrective Action
	4. Disconnect signal cable connector P3 from J1 on PCDP. Measure resistance between pins J and H of J1 on PCDP while varying **BRT** control setting from fully counterclockwise to fully clockwise. Resistance should vary smoothly from 0 to approximately 25 kΩ. a. If resistance varies normally, check signal cable. b. If resistance does not vary normally, replace PCDP.
Displays on PCDP dim normally as **BRT** control is rotated counterclockwise but panel illumination does not go off when **BRT** control is set fully clockwise.	Replace PCDP.

AIRBORNE UNIT POWER DISTRIBUTION (1 of 2)



AIRBORNE UNIT POWER DISTRIBUTION (2 of 2)



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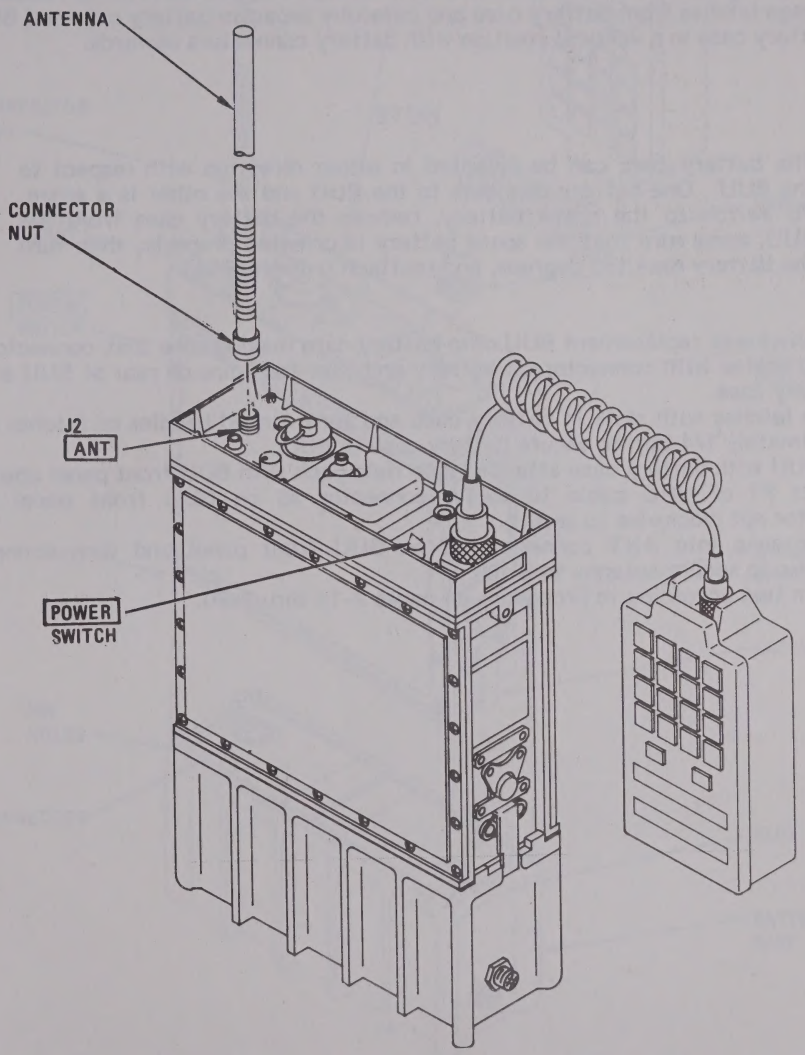
REPLACEMENT OF MANPACK ANTENNA

1. Turn **POWER** switch on BUU front panel fully counterclockwise to **OFF** position.
2. Using fingers, turn antenna connector nut counterclockwise and unplug antenna from **ANT** connector J2 on BUU front panel.
3. Plug replacement antenna into **ANT** connector J2 on BUU front panel and turn connector nut clockwise until fingertight.
4. Perform test according to procedure on pages 2-14 thru 2-20.



REPLACEMENT OF MANPACK BUU (1 of 2)

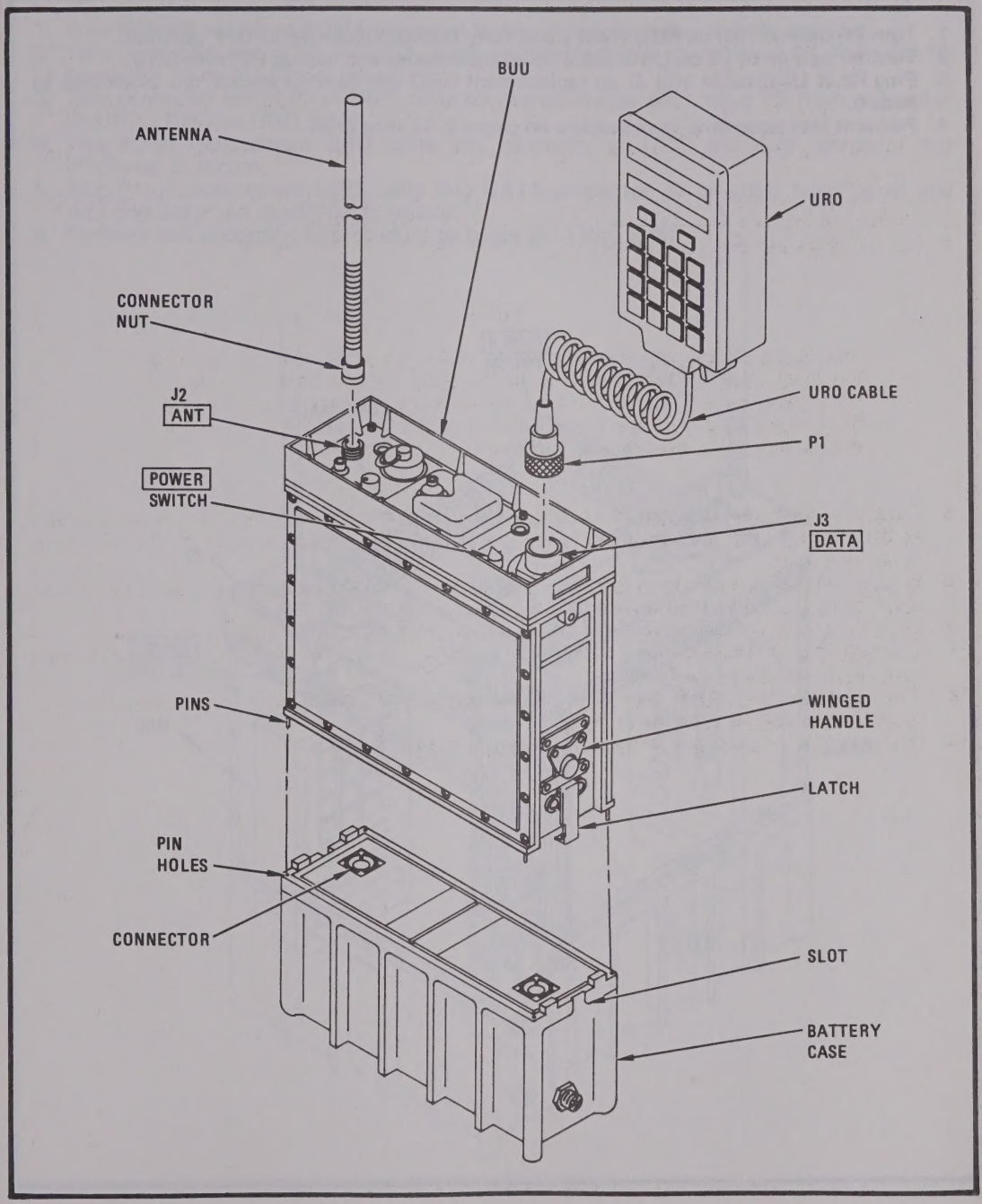
1. Turn **POWER** switch on BUU front panel fully counterclockwise to **OFF** position.
2. Turn P1 of URO cable counterclockwise and disconnect from **DATA** connector J3 on BUU front panel.
3. Turn connector nut of antenna counterclockwise and remove antenna from **ANT** connector J2 on BUU front panel.
4. Lift BUU with battery case attached from field pack and lay horizontally on a flat surface.
5. Lift winged handles on two latches and turn handles counterclockwise to release latches.
6. Disengage latches from battery case and carefully separate battery case and BUU.
7. Set battery case in a vertical position with battery connectors upwards.

NOTE

The battery case can be oriented in either direction with respect to the BUU. One battery connects to the BUU and the other is a spare. To switch to the spare battery, remove the battery case from the BUU, make sure that the spare battery is oriented properly, then turn the battery case 180 degrees, and reattach it to the BUU.

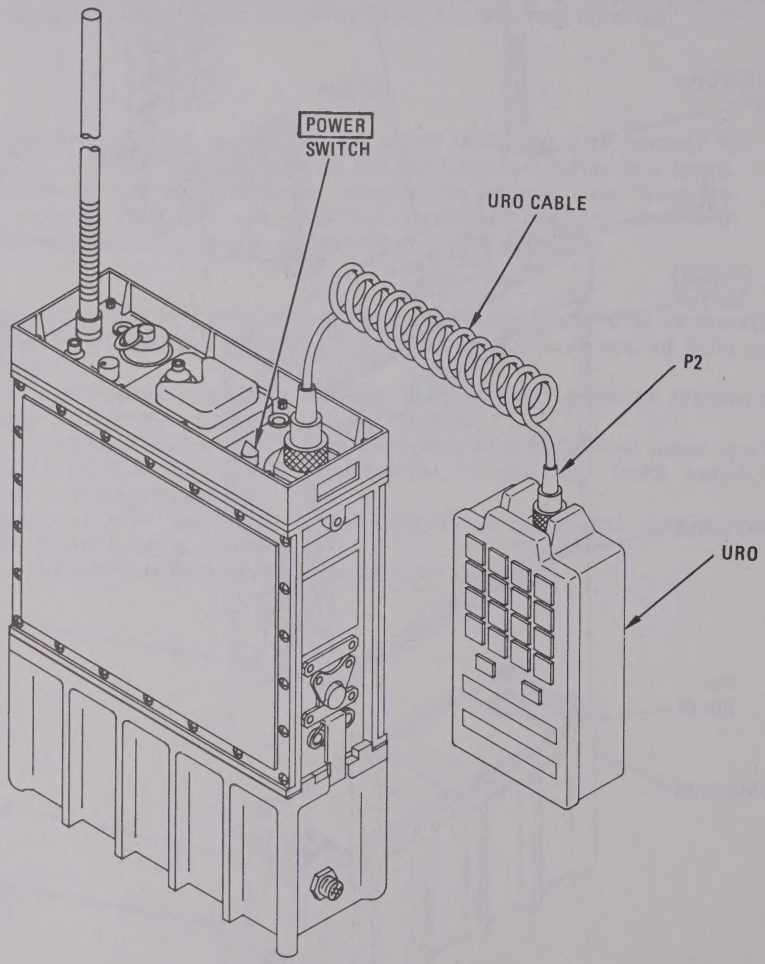
8. Carefully lower replacement BUU onto battery case making sure that connector on rear of BUU mates with connector on battery and that four pins on rear of BUU enter holes in battery case.
9. Engage latches with slots in battery case and turn winged handles on latches clockwise approximately 1/4 turn to secure battery case to BUU.
10. Slide BUU with battery case attached into field pack with BUU front panel upwards.
11. Connect P1 of URO cable to **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.
12. Plug antenna into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure antenna to BUU.
13. Perform test according to procedure on pages 2-14 thru 2-20.

REPLACEMENT OF MANPACK BUU (2 of 2)



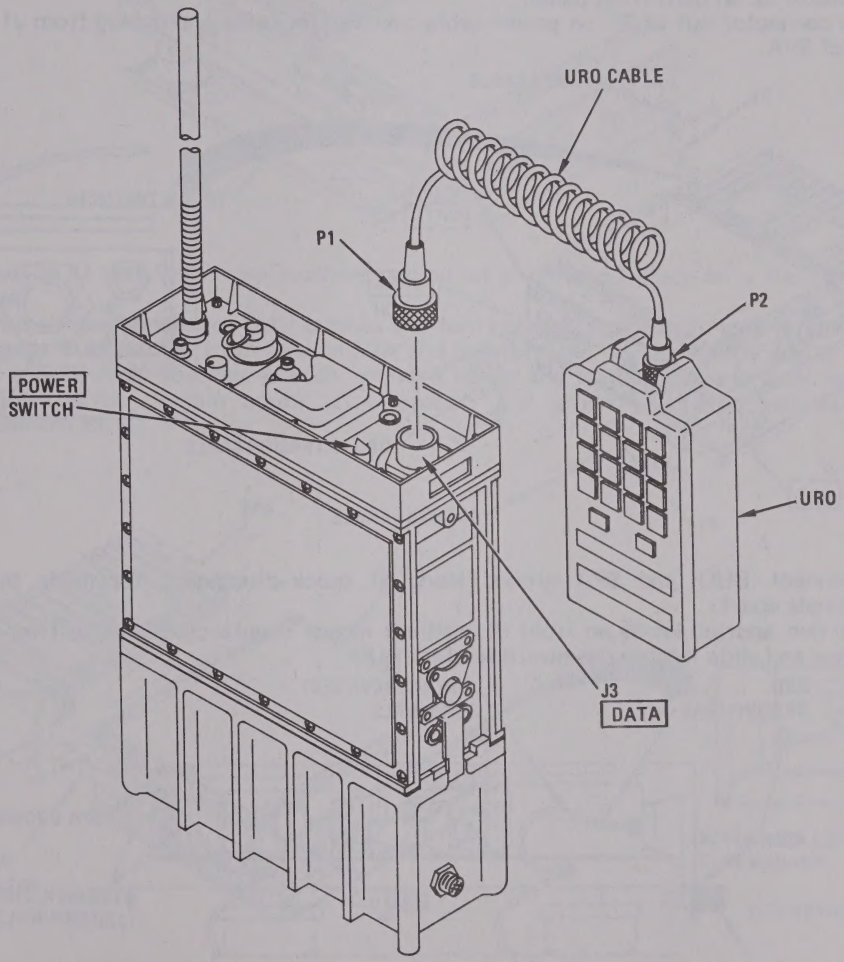
REPLACEMENT OF MANPACK URO

1. Turn **POWER** switch on BUU front panel fully counterclockwise to **OFF** position.
2. Turn connector of P2 on URO cable counterclockwise and unplug P2 from URO.
3. Plug P2 of URO cable into J1 on replacement URO and turn connector nut clockwise to secure.
4. Perform test according to procedure on pages 2-14 thru 2-20.



REPLACEMENT OF MANPACK URO CABLE

1. Turn **POWER** switch on BUU front panel fully counterclockwise to **OFF** position.
2. Turn connector nut of P1 of URO cable counterclockwise and unplug P1 from **DATA** connector J3 on BUU front panel.
3. Turn connector nut of P2 of URO cable counterclockwise and unplug P2 from connector on URO. Remove URO cable.
4. Plug P2 of replacement URO cable into connector on URO and turn connector nut clockwise to secure.
5. Plug P1 of replacement URO cable into **DATA** connector J3 on URO front panel and turn connector nut clockwise to secure.
6. Perform test according to procedure on pages 2-14 thru 2-20.



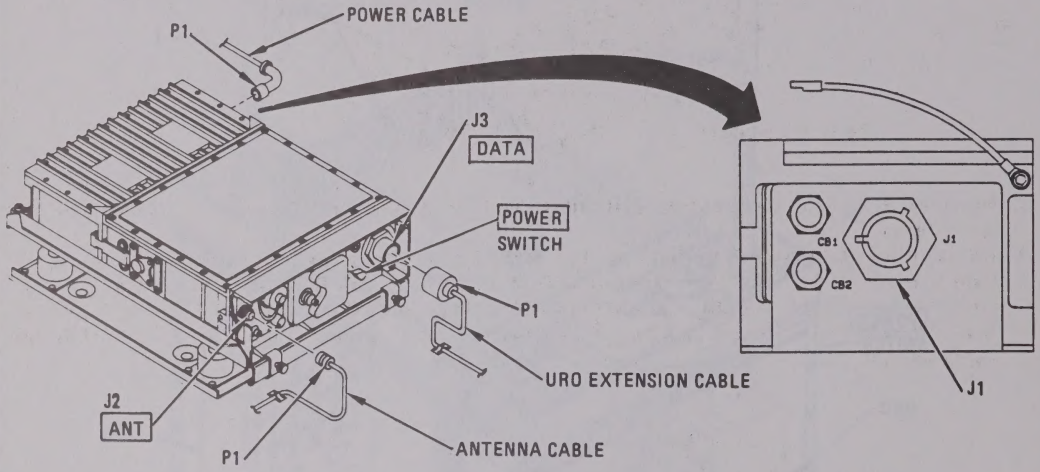
REPLACEMENT OF SURFACE VEHICLE UNIT BUU (1 of 6)

Tools:

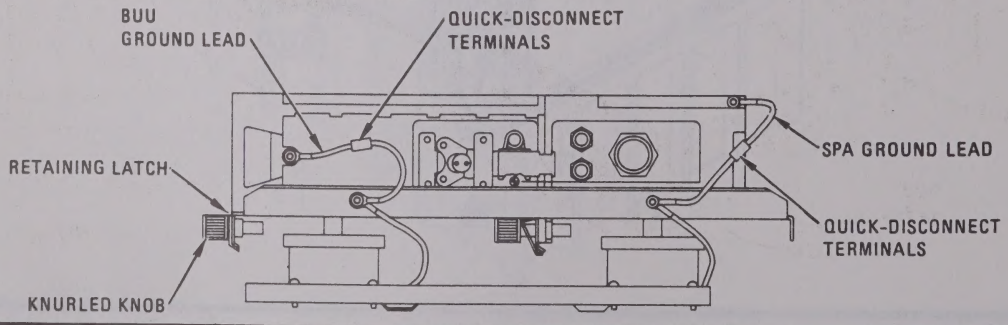
5/32-in. hex
key wrench

REMOVAL

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut of P1 on URO extension cable counterclockwise and unplug from **DATA** connector J3 on BUU front panel.
3. Turn connector nut of P1 on antenna cable counterclockwise and unplug from **ANT** connector J2 on BUU front panel.
4. Turn connector nut of P1 on power cable counterclockwise and unplug from J1 on right side of SPA.



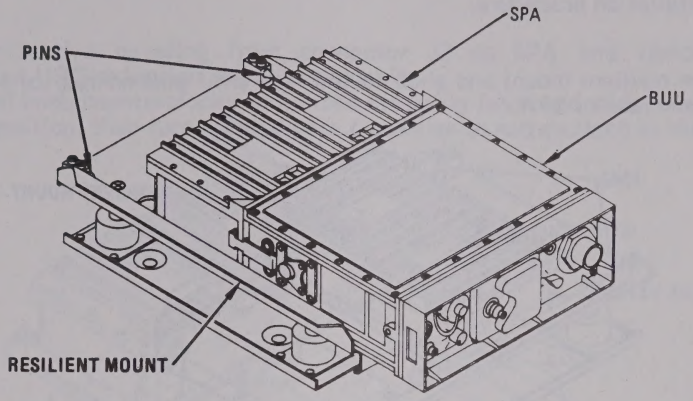
5. Disconnect BUU and SPA ground leads at quick-disconnect terminals by pulling terminals apart.
6. Turn two knurled knobs on front of resilient mount counterclockwise to free retaining latches and slide latches downward to clear BUU.



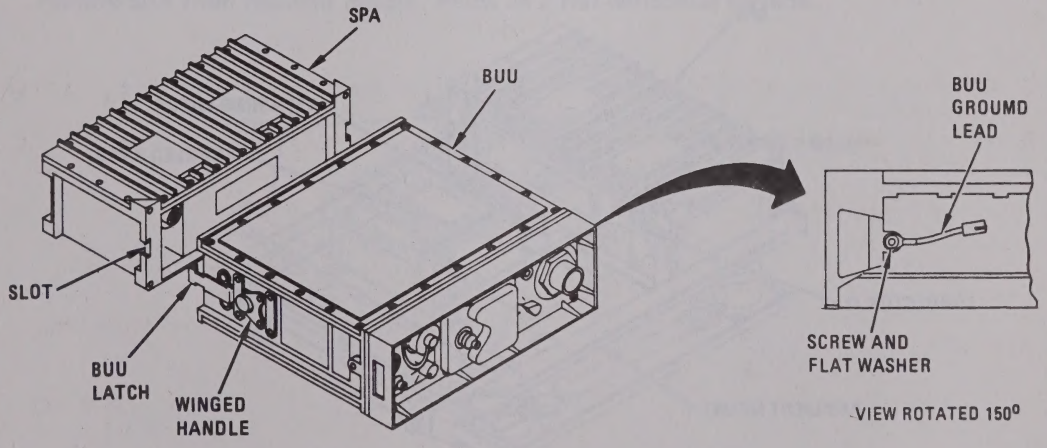
REPLACEMENT OF SURFACE VEHICLE UNIT BUU (2 of 6)

REMOVAL (cont)

7. Slide BUU and SPA forward as a unit until two pins at rear of resilient mount disengage from holes in rear of SPA.



8. Remove BUU and SPA from resilient mount as a unit and place on a flat horizontal surface.
9. Lift two winged handles on BUU latches and turn counterclockwise to free latches.
10. Disengage BUU latches from slots in SPA and carefully pull BUU and SPA apart.
11. Using a 5/32-inch hex key wrench, remove screw and flat washer and remove ground lead from BUU. Retain screw, flat washer, and ground lead for installation on replacement BUU.



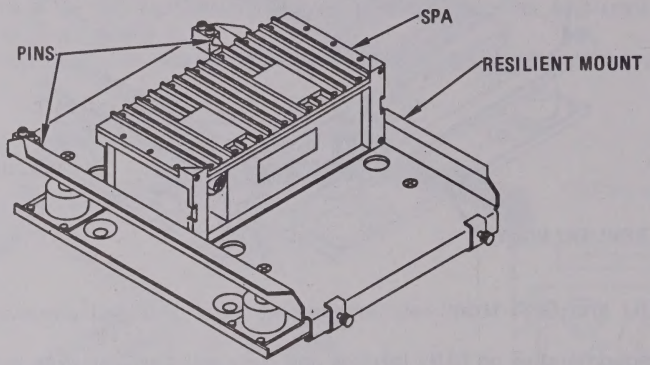
REPLACEMENT OF SURFACE VEHICLE UNIT BUU (3 of 6)

REMOVAL (cont)

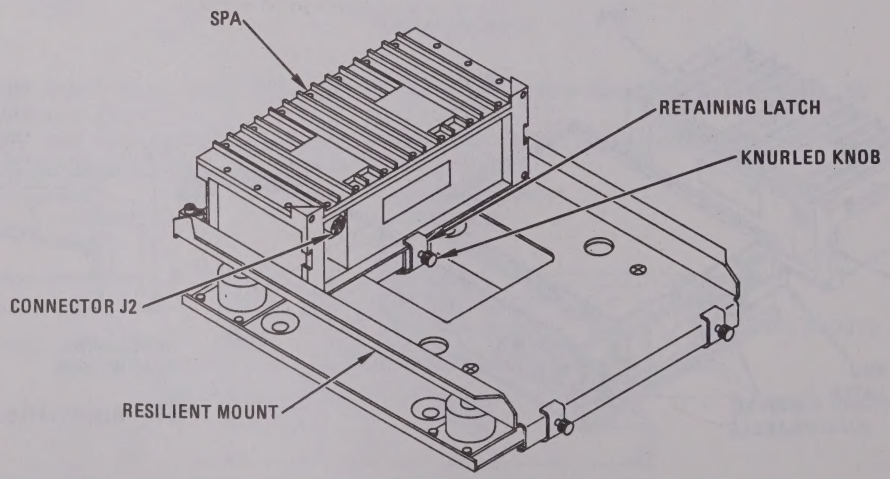
NOTE

If replacement BUU is to be installed immediately, skip to step 4 of the installation procedure.

12. Place SPA on resilient mount and slide to the rear until pins on rear of resilient mount engage holes in rear of SPA.



13. In center of resilient mount, turn knurled knob counterclockwise to free retaining latch and slide latch upward to engage SPA; then turn knurled knob clockwise to secure latch in this position.
14. Install protective cap on connectors of URO extension and antenna cables and provide protective covering on connector on SPA.



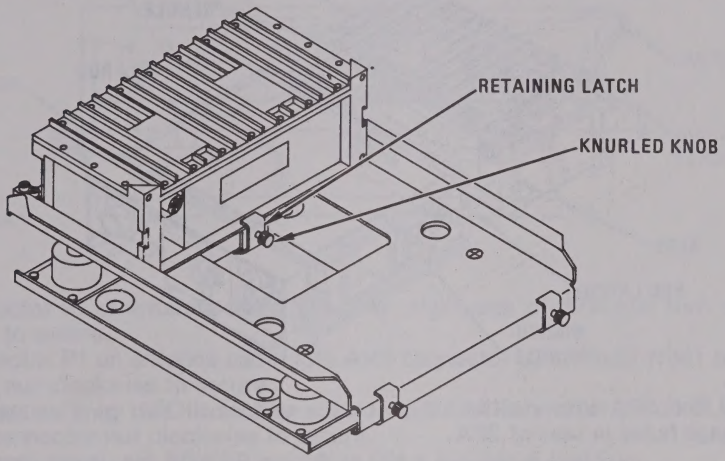
REPLACEMENT OF SURFACE VEHICLE UNIT BUU (4 of 6)

INSTALLATION

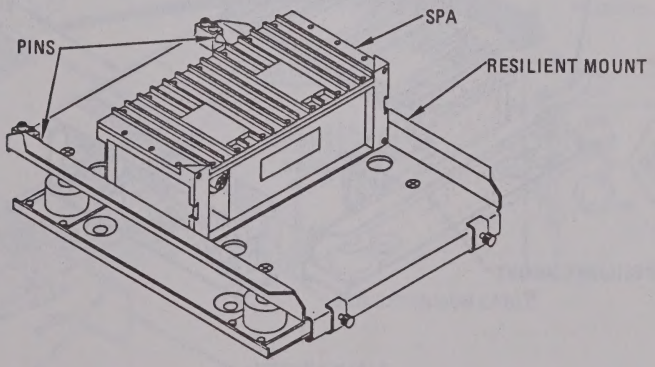
NOTE

If SPA has already been removed from resilient mount, skip to step 4.

1. Remove protective covering from connector J2 on SPA and remove caps from connectors on URO extension and antenna cables.
2. Turn knurled knob counterclockwise to free retaining latch and slide latch downward to its lowest position; then turn knurled knob clockwise to secure latch in this position.



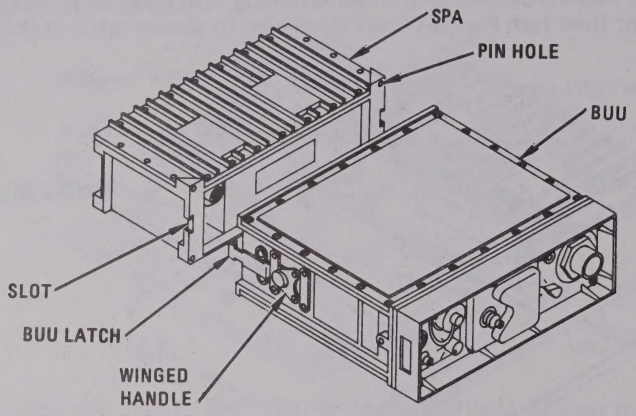
3. Slide SPA forward until pins at rear of resilient mount disengage from holes in SPA and remove SPA from resilient mount. Place on a flat horizontal surface.



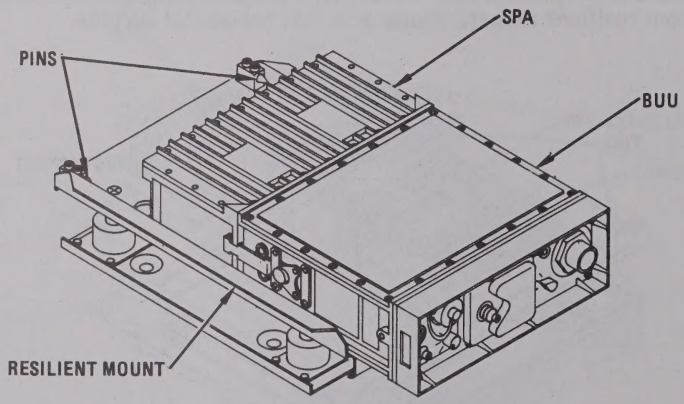
REPLACEMENT OF SURFACE VEHICLE UNIT BUU (5 of 6)

INSTALLATION (cont)

4. Place BUU on flat horizontal surface in front of SPA and slide BUU and SPA together making sure that connector on rear of BUU mates with connector on SPA and that four pins on rear of BUU enter four holes in SPA.
5. Engage BUU latches with slots in SPA and turn winged handles clockwise to secure BUU to SPA.
6. Position lug of BUU ground lead on BUU and secure to BUU with screw and flat washer, using 5/32-inch hex key wrench to tighten.



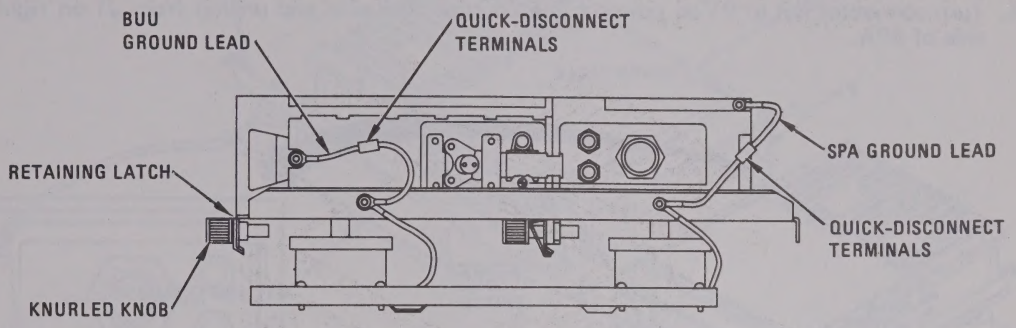
7. Slide BUU and SPA into resilient mount as a unit until two pins at rear of resilient mount engage holes in rear of SPA.



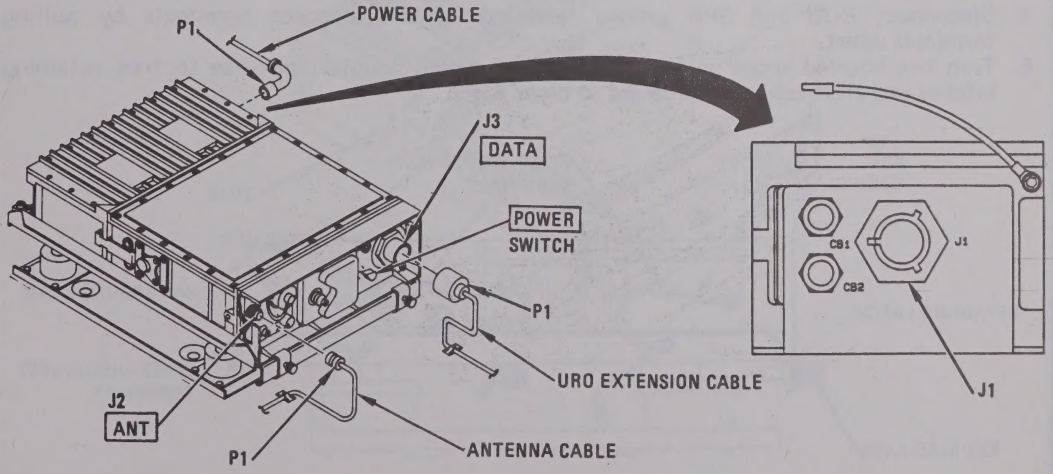
REPLACEMENT OF SURFACE VEHICLE UNIT BUU (6 of 6)

INSTALLATION (cont)

8. Slide two retaining latches upward to engage BUU and turn knurled knobs clockwise to secure latches.
9. Connect BUU and SPA ground leads by snapping two halves of quick-disconnect terminals together.



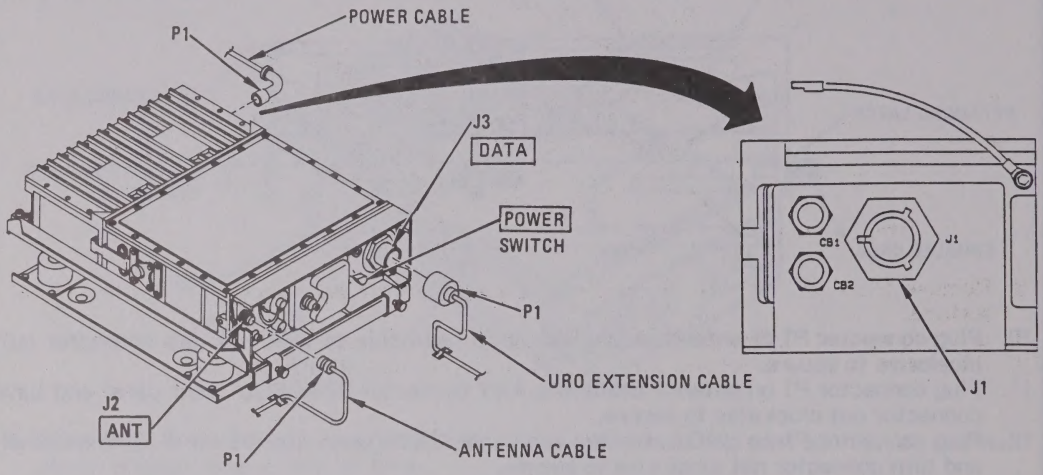
10. Plug connector P1 of antenna cable into J1 on right side of SPA and turn connector nut clockwise to secure.
11. Plug connector P1 on antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
12. Plug connector P1 on URO extension cable into **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.
13. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
14. Perform test according to procedure on pages 2-21 thru 2-30.



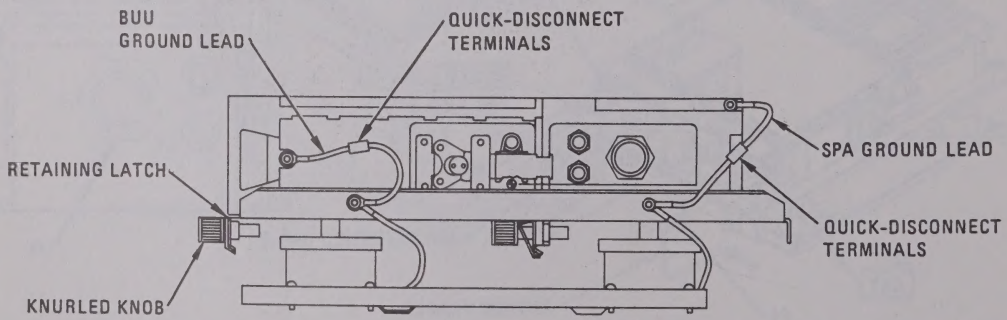
REPLACEMENT OF SURFACE VEHICLE UNIT SPA (1 of 4)

REMOVAL

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut of P1 on URO extension cable counterclockwise and unplug from **DATA** connector J3 on BUU front panel.
3. Turn connector nut of P1 on antenna cable counterclockwise and unplug from **ANT** connector J2 on BUU front panel.
4. Turn connector nut of P1 on power cable counterclockwise and unplug from J1 on right side of SPA.



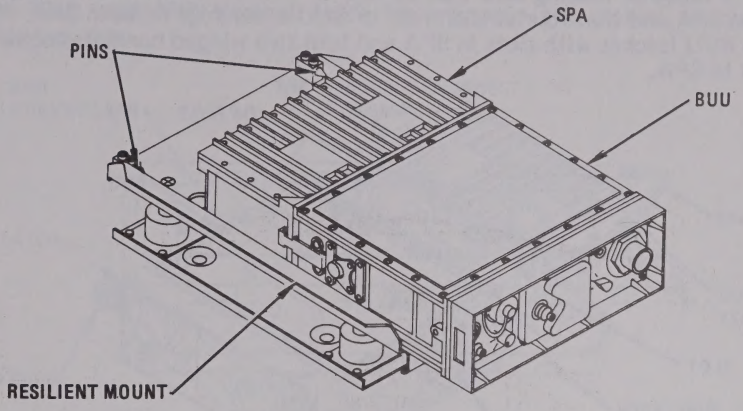
5. Disconnect BUU and SPA ground leads at quick-disconnect terminals by pulling terminals apart.
6. Turn two knurled knobs on front of resilient mount counterclockwise to free retaining latches and slide latches downward to clear BUU.



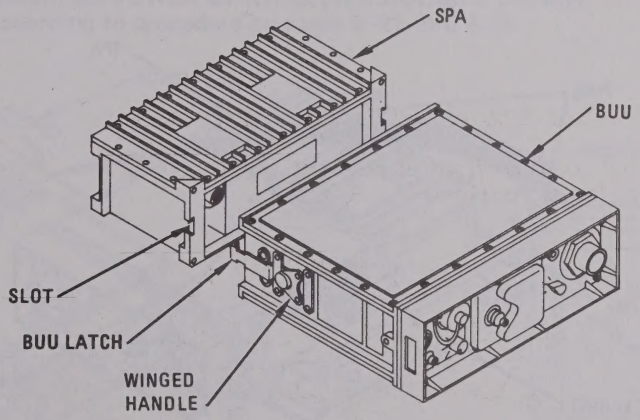
REPLACEMENT OF SURFACE VEHICLE UNIT SPA (2 of 4)

REMOVAL (cont)

7. Slide BUU and SPA forward as a unit until two pins at rear of resilient mount disengage from holes in rear of SPA.



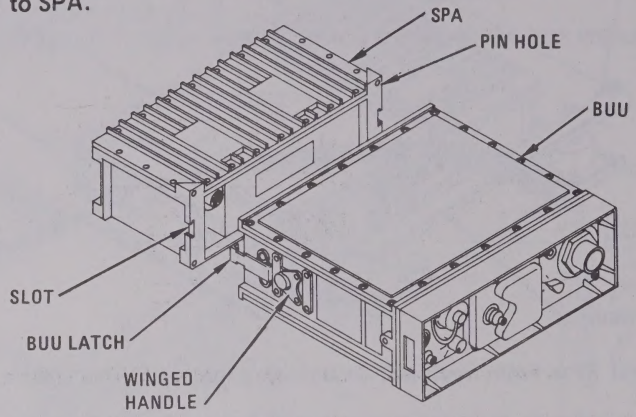
8. Remove BUU and SPA from resilient mount as a unit and place on a flat horizontal surface.
9. Lift two winged handles on BUU latches and turn counterclockwise to free latches.
10. Disengage BUU latches from slots in SPA and carefully pull BUU and SPA apart.



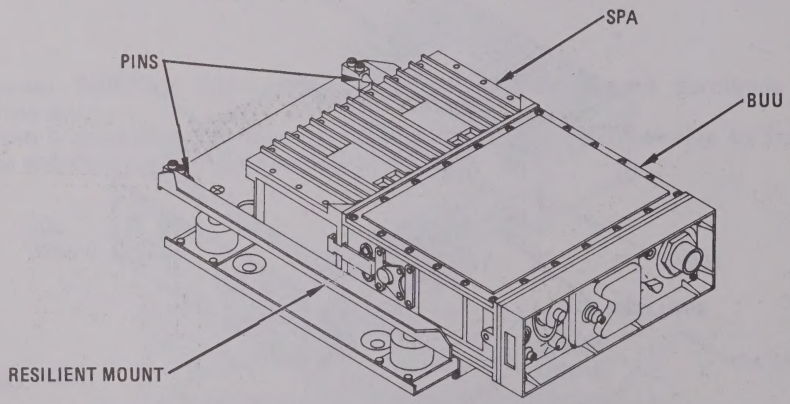
REPLACEMENT OF SURFACE VEHICLE UNIT SPA (3 of 4)

INSTALLATION

1. Place BUU and replacement SPA on a flat surface with BUU in front of SPA and slide BUU and SPA together making sure that connector on rear of BUU mates with connector on SPA and that four pins on rear of BUU enter four holes in SPA.
2. Engage two BUU latches with slots in SPA and turn two winged handles clockwise to secure BUU to SPA.



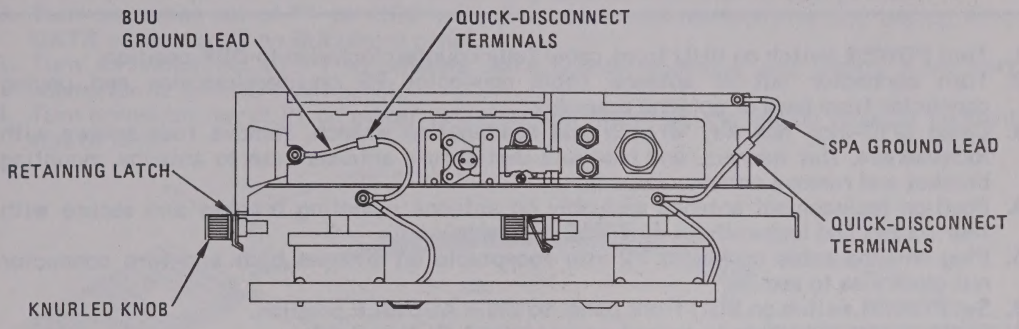
3. Slide BUU and SPA into resilient mount as a unit until two pins at rear of resilient mount engage holes in rear of SPA.



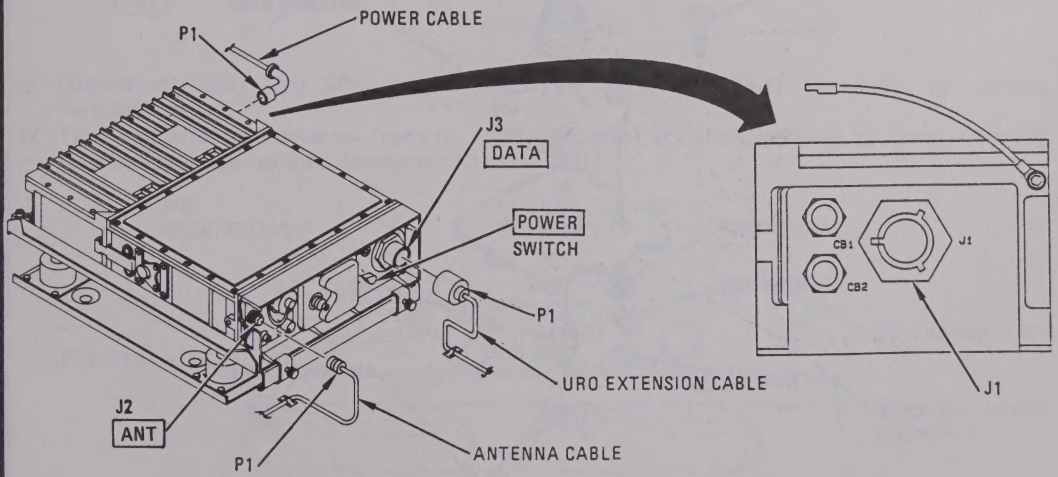
REPLACEMENT OF SURFACE VEHICLE UNIT SPA (4 of 4)

INSTALLATION (cont)

4. Slide two retaining latches upward to engage BUU and turn knurled knobs clockwise to secure latches.
5. Connect BUU and SPA ground leads by snapping two halves of quick-disconnect terminals together.



6. Plug connector P1 on power cable into J1 on right side of SPA and turn connector nut clockwise to secure.
7. Plug connector P1 on antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
8. Plug connector P1 on URO extension cable into **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.
9. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
10. Perform test according to procedure on pages 2-21 thru 2-30.

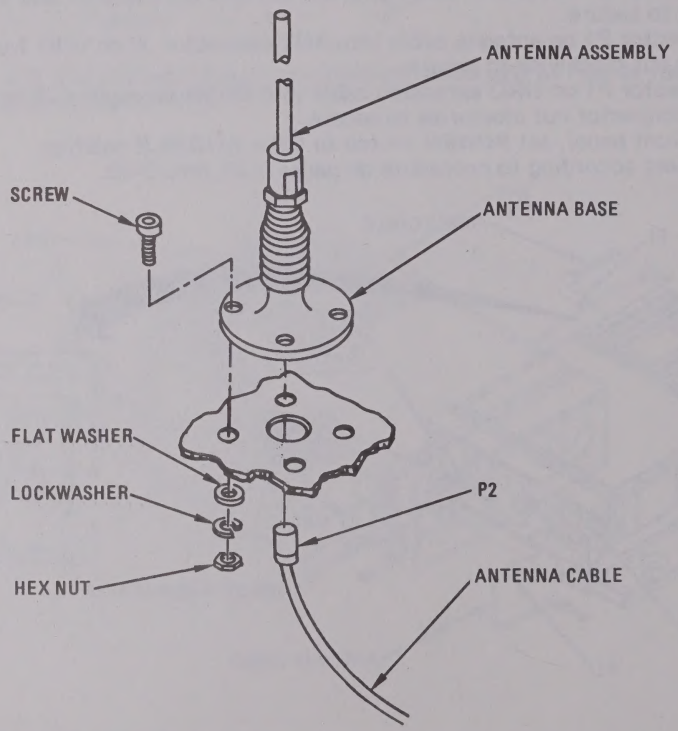


REPLACEMENT OF SURFACE VEHICLE UNIT ANTENNA ASSEMBLY

Tools:

5/16-in hex key wrench
7/16-in combination wrench

1. Turn **POWER** switch on BUU front panel fully counterclockwise to **OFF** position.
2. Turn connector nut of antenna cable connector P2 counterclockwise and unplug connector from base of antenna assembly.
3. Using 5/16-inch hex key wrench and combination wrench, remove four screws with lockwashers, flat washers, and hex nuts that secure antenna base to antenna mounting bracket and remove antenna assembly.
4. Position replacement antenna assembly on antenna mounting bracket and secure with four screws and lockwashers, flat washers and hex nuts.
5. Plug antenna cable connector P2 into receptacle on antenna base and turn connector nut clockwise to secure.
6. Set **POWER** switch on BUU front panel to **ON + AUDIBLE** position.
7. Perform test according to procedure on pages 2-21 thru 2-30.



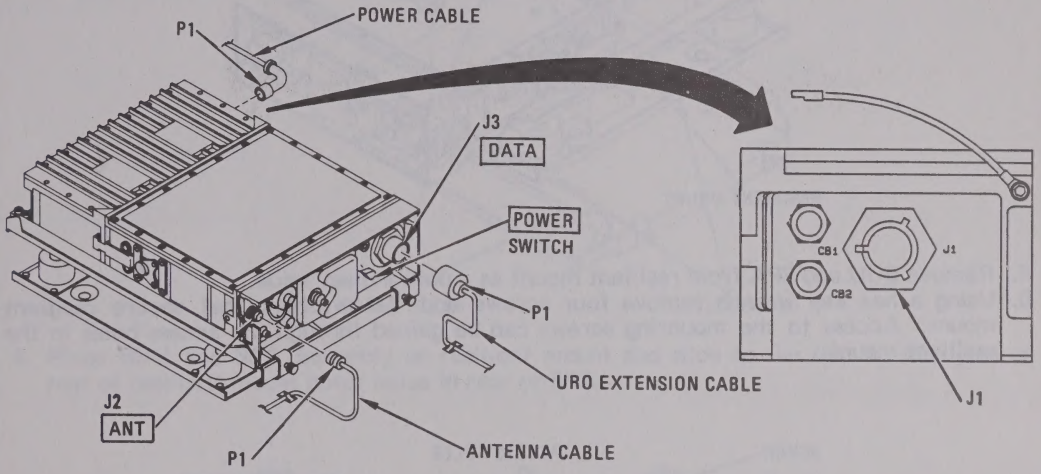
REPLACEMENT OF SURFACE VEHICLE UNIT RESILIENT MOUNT (1 of 4)

Tools:

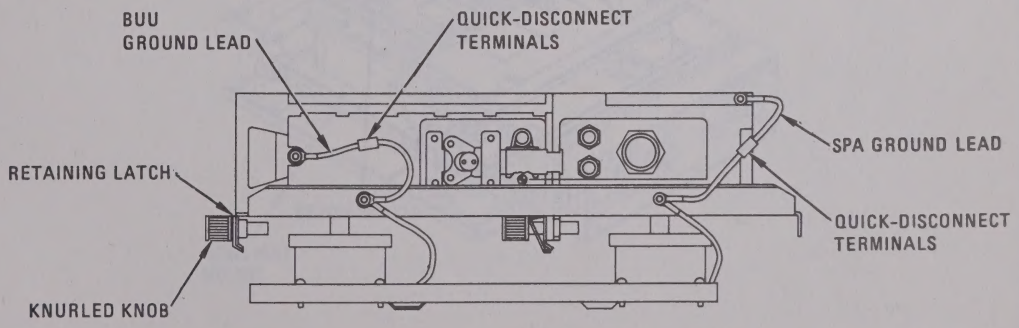
5/32 in. hex key wrench

REMOVAL

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut of P1 on URO extension cable counterclockwise and unplug from **DATA** connector J3 on BUU front panel.
3. Turn connector nut of P1 on antenna cable counterclockwise and unplug from **ANT** connector J2 on BUU front panel.
4. Turn connector nut of P1 on power cable counterclockwise and unplug from J1 on right side of SPA.



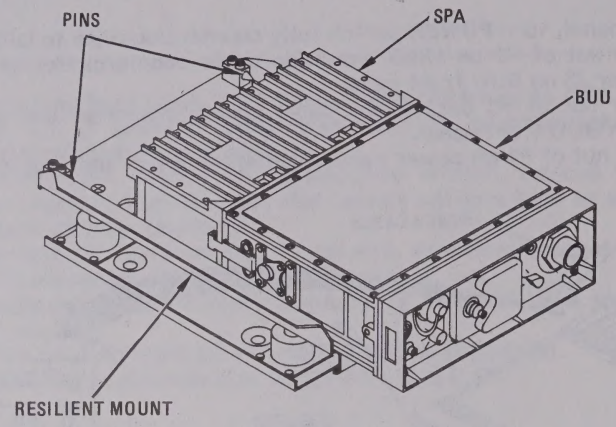
5. Disconnect BUU and SPA ground leads at quick-disconnect terminals by pulling terminals apart.
6. Turn two knurled knobs on front of resilient mount counterclockwise to free retaining latches and slide latches downward to clear BUU.



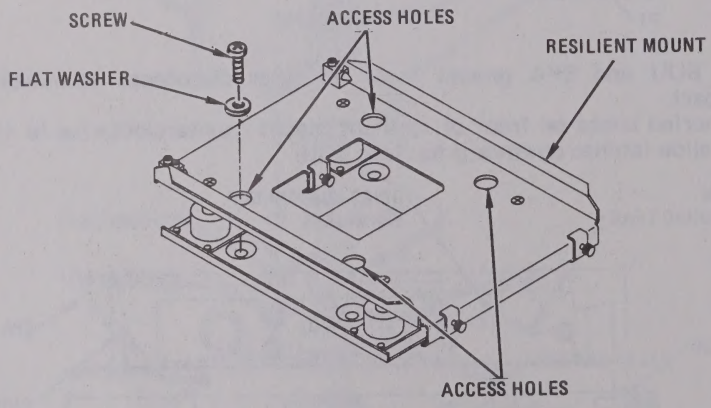
REPLACEMENT OF SURFACE VEHICLE UNIT RESILIENT MOUNT (2 of 4)

REMOVAL (cont)

7. Slide BUU and SPA forward as a unit until two pins at rear of resilient mount disengage from holes in rear of SPA.



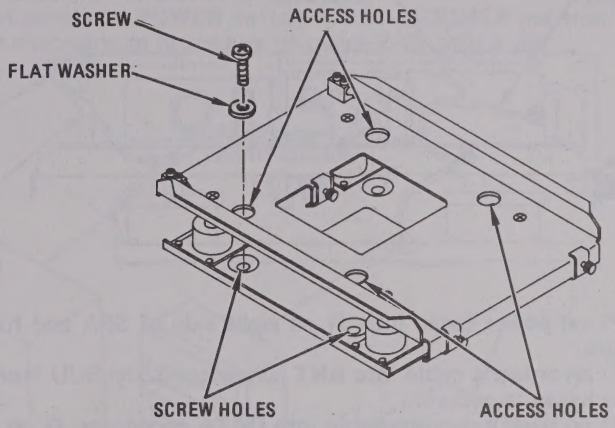
8. Remove BUU and SPA from resilient mount as a unit and set aside.
9. Using a hex key wrench remove four screws and flat washers that secure resilient mount. Access to the mounting screws can be gained through the access holes in the resilient mount.



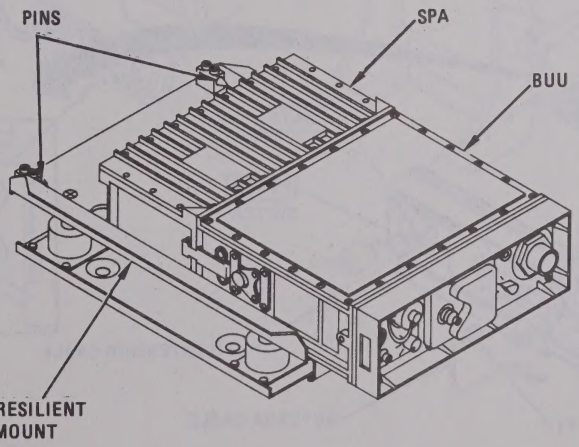
REPLACEMENT OF SURFACE VEHICLE UNIT RESILIENT MOUNT (3 of 4)

INSTALLATION

1. Clean all corrosion, oxidation, paint, or any other substance from mounting feet of resilient mount and from mating area in vehicle to assure good electrical contact.
2. Position resilient mount in vehicle and aline screw holes in resilient mount with screw holes in vehicle.
3. Secure resilient mount to vehicle with four screws and flat washers. The mounting screws can be tightened through the access holes in the resilient mount.



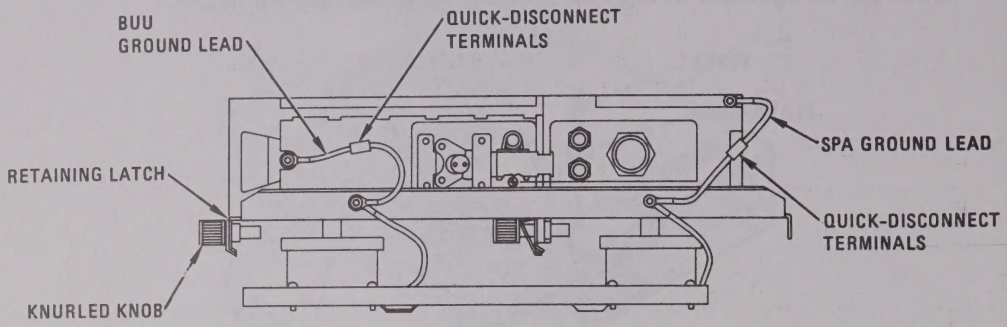
4. Place BUU and SPA assembly on resilient mount and slide to the rear so that pins on rear of resilient mount enter holes in rear of SPA.



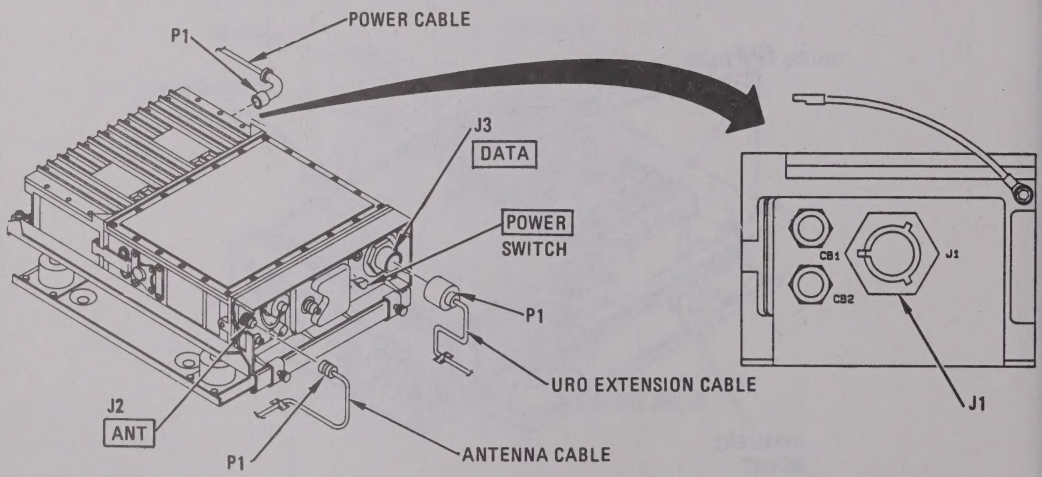
REPLACEMENT OF SURFACE VEHICLE UNIT RESILIENT MOUNT (4 of 4)

INSTALLATION (cont)

5. Slide two retaining latches upwards to engage BUU and turn knurled knobs clockwise to secure latches.
6. Connect BUU and SPA ground leads by snapping two halves of quick-disconnect terminals together.

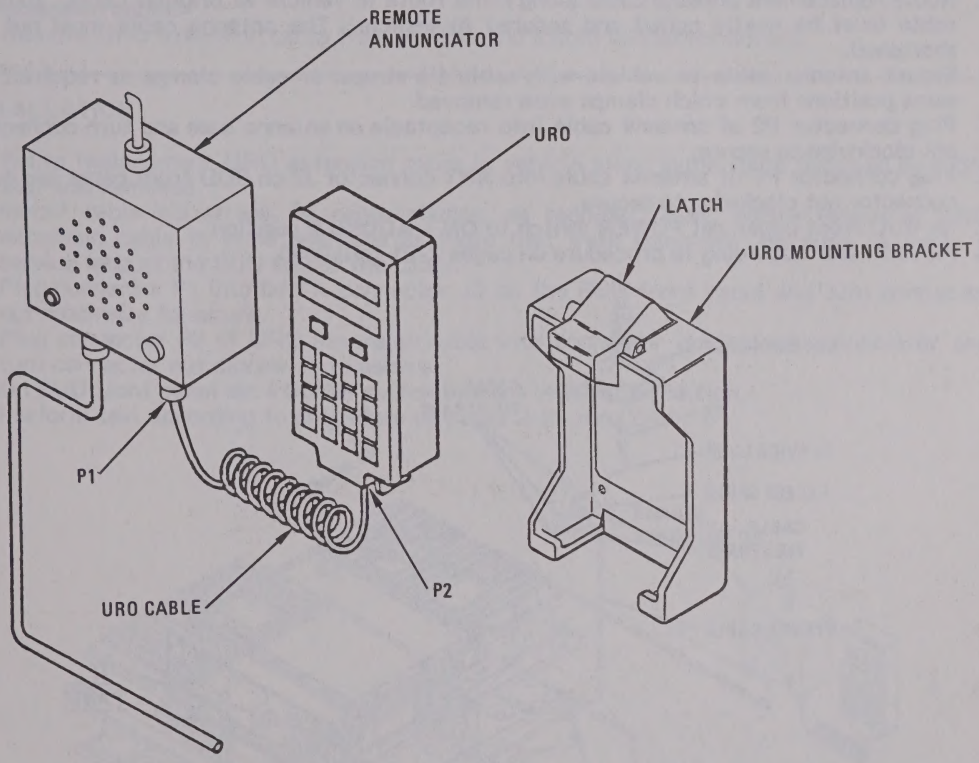


7. Plug connector P1 on power cable into J1 on right side of SPA and turn connector nut clockwise to secure.
8. Plug connector P1 on antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
9. Plug connector P1 on URO extension cable into **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.
10. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
11. Perform test according to procedure on pages 2-21 thru 2-30.



REPLACEMENT OF SURFACE VEHICLE UNIT URO CABLE

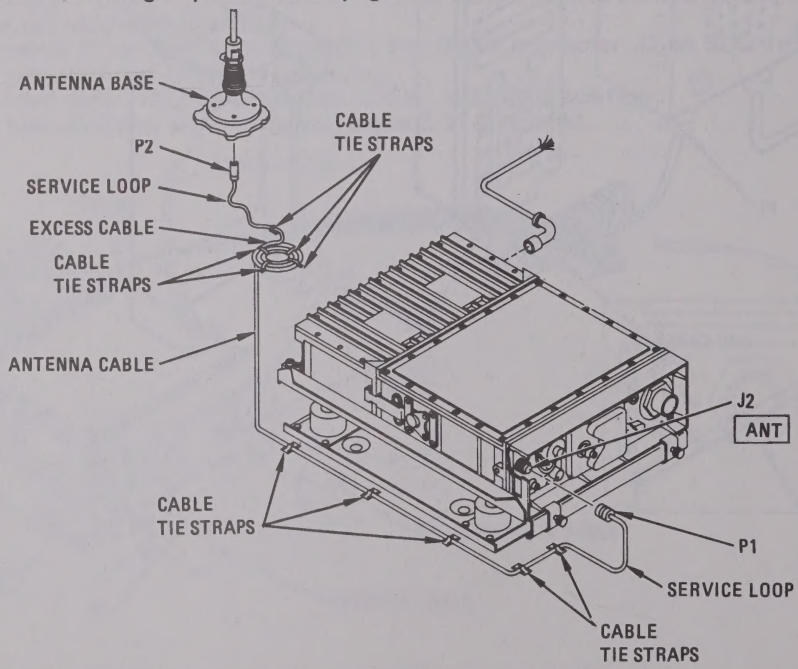
1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut of connector P1 counterclockwise and disconnect URO cable from remote annunciator.
3. Press latch and lift URO from URO mounting bracket. Turn connector P2 counterclockwise and unplug connector from J1 on URO.
4. Plug connector P2 of replacement URO cable into connector on URO and turn connector nut clockwise to secure.
5. Plug connector P1 of replacement URO cable into receptacle on remote annunciator and turn connector nut clockwise to secure.
6. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
7. Perform test according to procedure on pages 2-21 thru 2-30.



REPLACEMENT OF SURFACE VEHICLE UNIT ANTENNA CABLE

Tools:	Materials/Parts:
Diagonal cutting pliers	Cable tie straps

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut on connector P2 of antenna cable counterclockwise and unplug P2 from antenna base.
3. Turn connector nut on connector P1 of antenna cable counterclockwise and unplug P1 from **ANT** connector J2 on BUU front panel.
4. Cut cable tie straps, or remove cable clamps, as required, along entire length of antenna cable and remove antenna cable from vehicle.
5. Route replacement antenna cable along same route in vehicle as original cable. Excess cable must be neatly coiled and secured to vehicle. The antenna cable must not be shortened.
6. Secure antenna cable to vehicle with cable tie straps, or cable clamps as required, in same positions from which clamps were removed.
7. Plug connector P2 of antenna cable into receptacle on antenna base and turn connector nut clockwise to secure.
8. Plug connector P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
9. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
10. Perform test according to procedure on pages 2-21 thru 2-30.



REPLACEMENT OF SURFACE VEHICLE UNIT URO EXTENSION CABLE

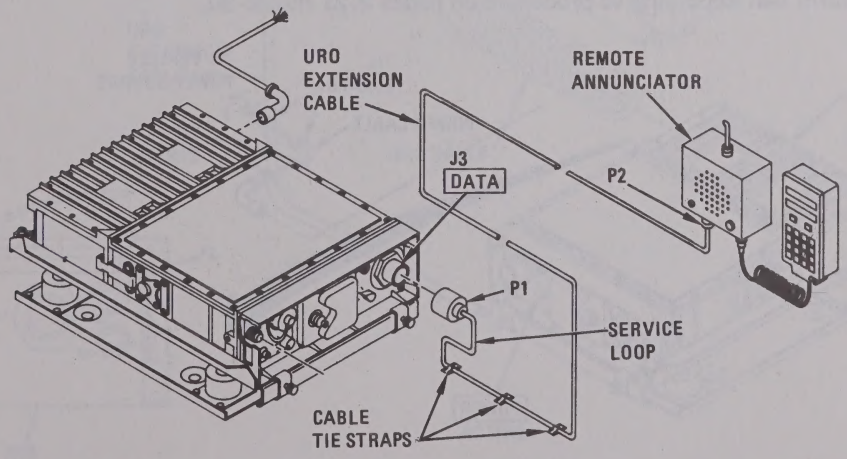
Tools:	Materials/Parts:
Diagonal cutting pliers	Cable tie straps

REMOVAL

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut of connector P1 on URO extension cable counterclockwise and unplug P1 from **DATA** connector J3 on BUU front panel.
3. Turn connector nut of connector P2 on URO extension cable counterclockwise and unplug P2 from remote annunciator.
4. Cut cable tie straps, or remove cable clamps, as required, along entire length of URO extension cable.
5. Remove URO extension cable from vehicle and install connector covers.

INSTALLATION

1. Route replacement URO extension cable in vehicle along same route followed by cable that was removed.
2. Install cable tie straps, or cable clamps, as required, along entire length of URO extension cable in same positions as those that were removed. Be sure to leave a service loop at the BUU end of the cable.
3. Plug connector P1 into **DATA** connector J3 on the BUU front panel and turn connector nut clockwise to secure.
4. Plug connector P2 of URO extension cable into connector on remote annunciator and turn connector nut clockwise to secure.
5. On BUU front panel set **POWER** switch to **ON + AUDIBLE** position.
6. Perform test according to procedure on pages 2-21 thru 2-30.



REPLACEMENT OF SURFACE VEHICLE UNIT POWER CABLE

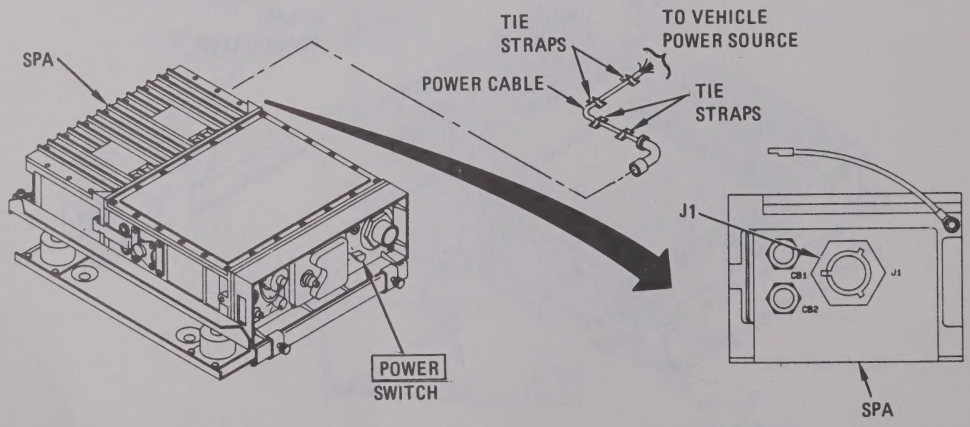
Tools:	Materials/Parts:
Tool kit TK-101/G Diagonal cutting pliers	Cable tie straps

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn off or disconnect vehicle power source.
3. Turn connector nut of P1 on power cable counterclockwise and unplug P1 from J1 on right side of SPA.

NOTE

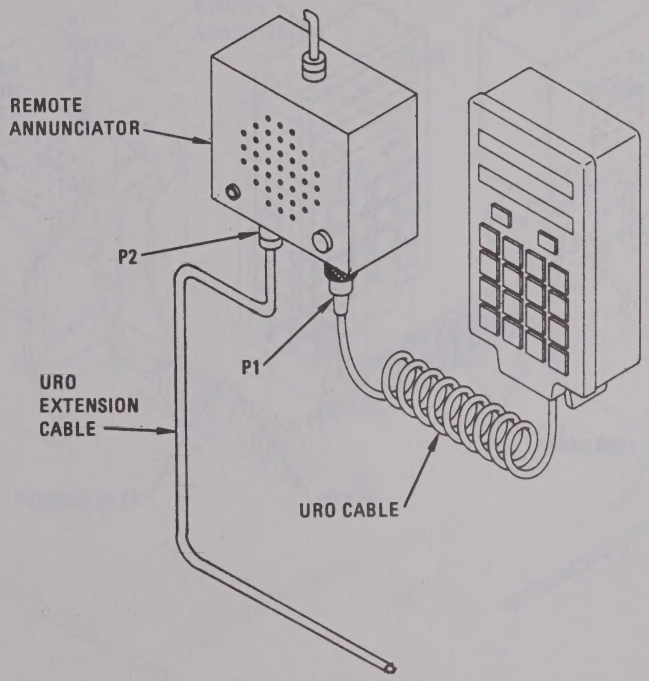
Termination of the power source end of the power cable varies depending on the type of vehicle in which the radio set is installed.

4. Disconnect power cable from vehicle.
5. Cut tie straps or remove cable clamps, as required, along entire length of power cable.
6. Send removed power cable to direct support for repair or have direct support supply a properly terminated replacement power cable for the type of vehicle in which radio set is installed.
7. Route replacement power cable in vehicle along same route as removed cable.
8. Secure replacement power cable to vehicle with cable tie straps or cable clamps, as required, in same positions as those that were removed.
9. Connect power cable to power source in vehicle. The black wires connect to a +20 to +32 V power source and the white wires connect to the dc return.
10. Plug connector P1 of power cable into J1 on right side of SPA and turn connector nut clockwise to secure.
11. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
12. Perform test according to procedure on pages 2-21 thru 2-30.



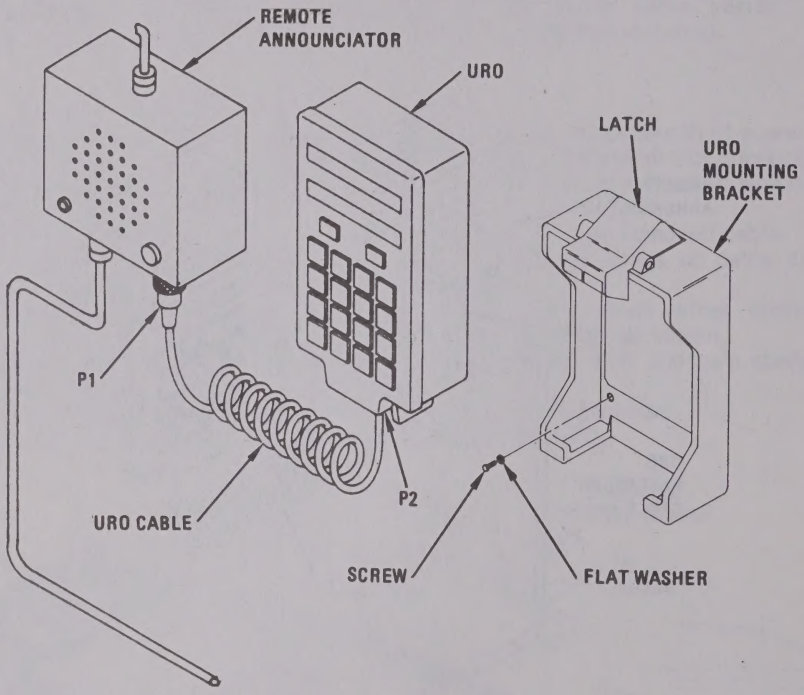
REPLACEMENT OF SURFACE VEHICLE UNIT REMOTE ANNUNCIATOR

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Turn connector nut of P2 on URO extension cable counterclockwise and unplug from connector on remote annunciator.
3. Turn connector nut of P1 on URO cable counterclockwise and unplug from connector on remote annunciator.
4. Remove hardware securing remote annunciator to vehicle and remove remote annunciator.
5. Position replacement remote annunciator in vehicle and secure with appropriate hardware.
6. Plug connector P1 of URO cable into connector on remote annunciator and turn connector nut clockwise to secure.
7. Plug connector P2 of URO extension cable into connector on remote annunciator and turn connector nut clockwise to secure.
8. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.



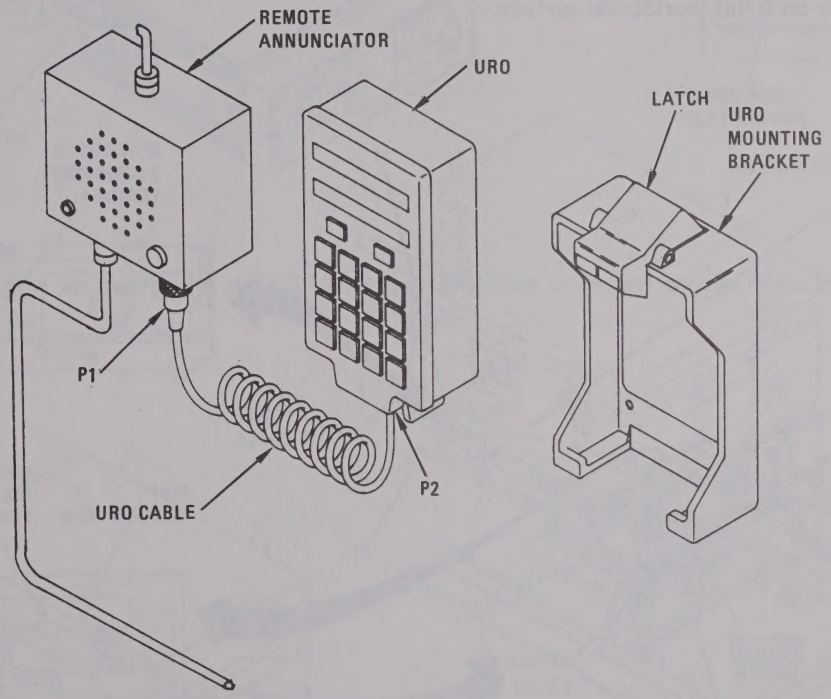
REPLACEMENT OF SURFACE VEHICLE UNIT URO MOUNTING BRACKET

1. Press down on latch on URO mounting bracket and lift URO from mounting bracket and set aside.
2. Remove hardware securing URO mounting bracket to vehicle and remove URO mounting bracket.
3. Place replacement URO mounting bracket in position in vehicle and secure with appropriate hardware.
4. Place URO in mounting bracket and latch in place.



REPLACEMENT OF SURFACE VEHICLE UNIT URO

1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF** position.
2. Press down on latch and remove URO from URO mounting bracket.
3. Turn connector nut of connector P2 on URO cable counterclockwise and unplug P2 from receptacle on URO.
4. Plug connector P2 on URO cable into receptacle on replacement URO and turn connector nut clockwise to secure.
5. Place URO in URO mounting bracket and latch in place.
6. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
7. Perform test according to procedure on pages 2-21 thru 2-30.



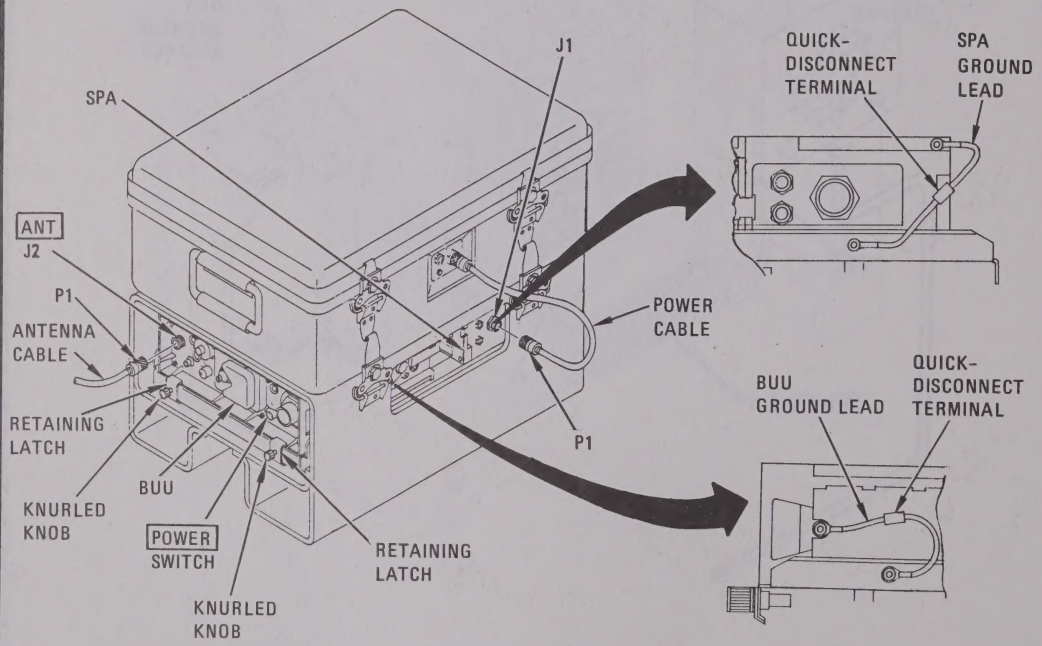
REPLACEMENT OF AUXILIARY GROUND UNIT BUU (1 of 4)

Tools:

5/32-inch hex key wrench

REMOVAL

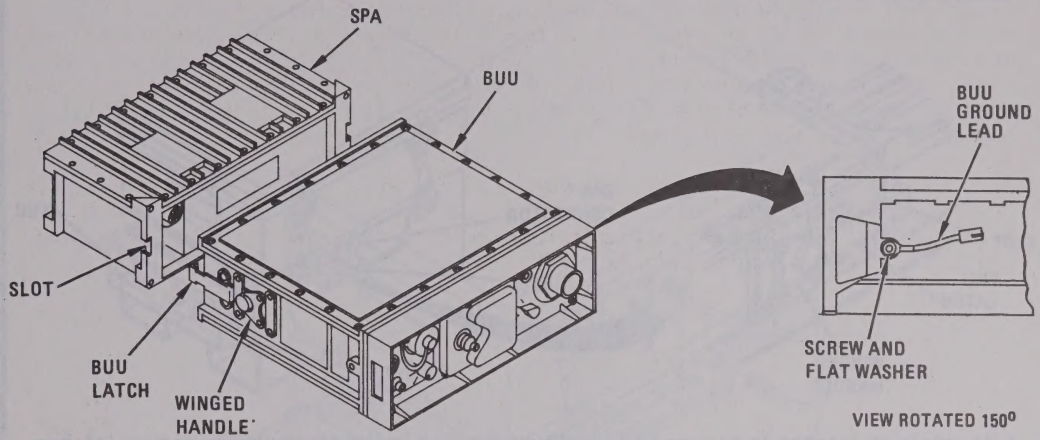
1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
2. Turn connector nut of connector P1 on power cable counterclockwise until free, and unplug P1 from J1 on SPA.
3. Turn connector nut of connector P1 on antenna cable counterclockwise until free, and unplug P1 from **ANT** connector J2 on BUU front panel.
4. Disconnect BUU and SPA ground leads at quick-disconnect terminals by pulling terminals apart.
5. Turn two knurled knobs counterclockwise until retaining latches are free and slide latches downward to clear BUU.
6. Slide BUU and SPA forward as a unit, remove from power adapter assembly housing, and lay on a flat, horizontal surface.



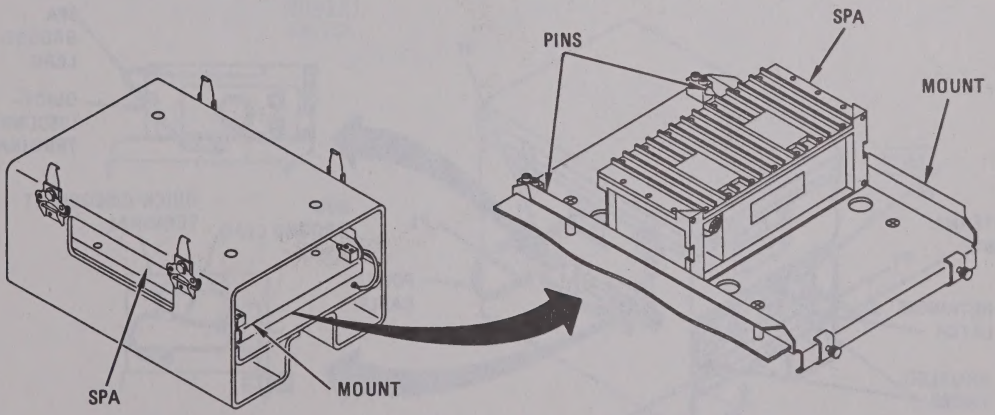
REPLACEMENT OF AUXILIARY GROUND UNIT BUU (2 of 4)

REMOVAL (cont)

7. Lift two winged handles and turn counterclockwise to release BUU latches.
8. Lift BUU latches to clear slots in SPA and pull BUU and SPA apart.
9. Using a 5/32-inch hex key wrench, remove screw and flat washer and remove ground lead from BUU. Retain screw, washer, and ground lead for installation on replacement BUU.



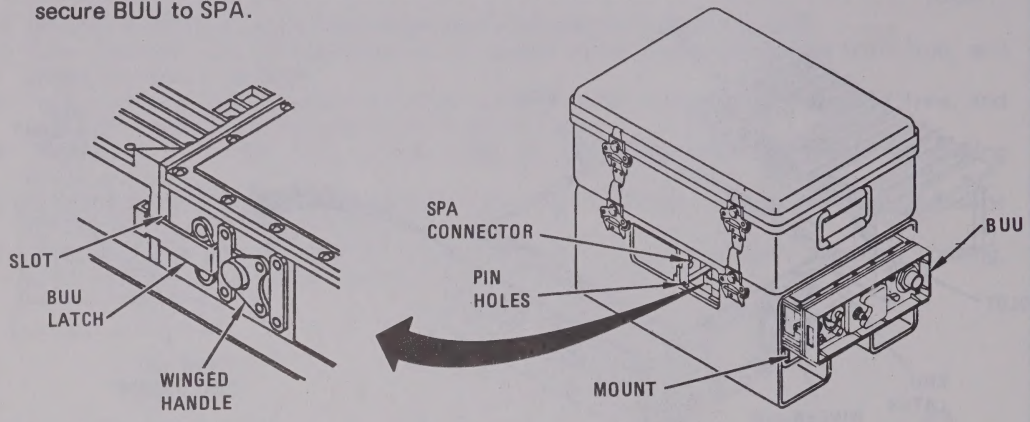
10. Place SPA on mount and slide SPA to rear until pins on mount engage holes in rear of SPA.



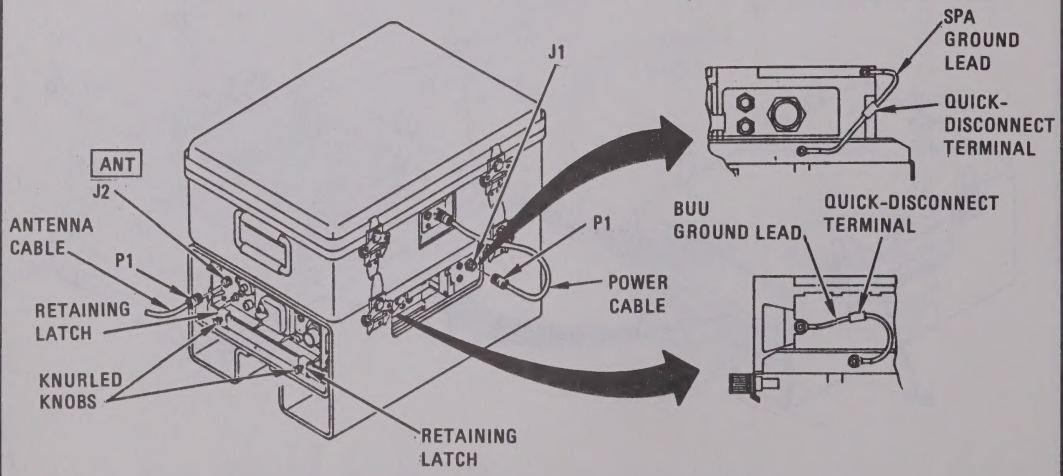
REPLACEMENT OF AUXILIARY GROUND UNIT BUU (3 of 4)

INSTALLATION

1. Install ground lead on BUU and secure with screw and washer removed from faulty BUU.
2. Place BUU on mount and slide BUU to rear, making sure that connector on rear of BUU mates with connector on SPA and that four pins on rear of BUU enter holes in SPA.
3. Engage BUU latches with slots in SPA and lift winged handles and turn clockwise to secure BUU to SPA.



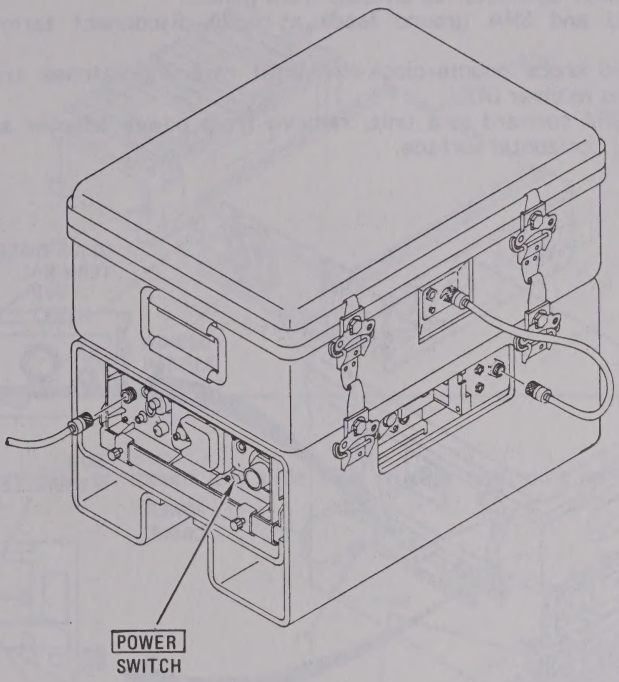
4. Lift retaining latches to engage BUU and turn knurled knobs clockwise to secure latches in this position.
5. Connect BUU and SPA ground leads by snapping quick-disconnect terminals together.
6. Plug connector on P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
7. Plug connector P1 of power cable into J1 on SPA and turn connector nut clockwise to secure.



REPLACEMENT OF AUXILIARY GROUND UNIT BUU (4 of 4)

INSTALLATION (cont)

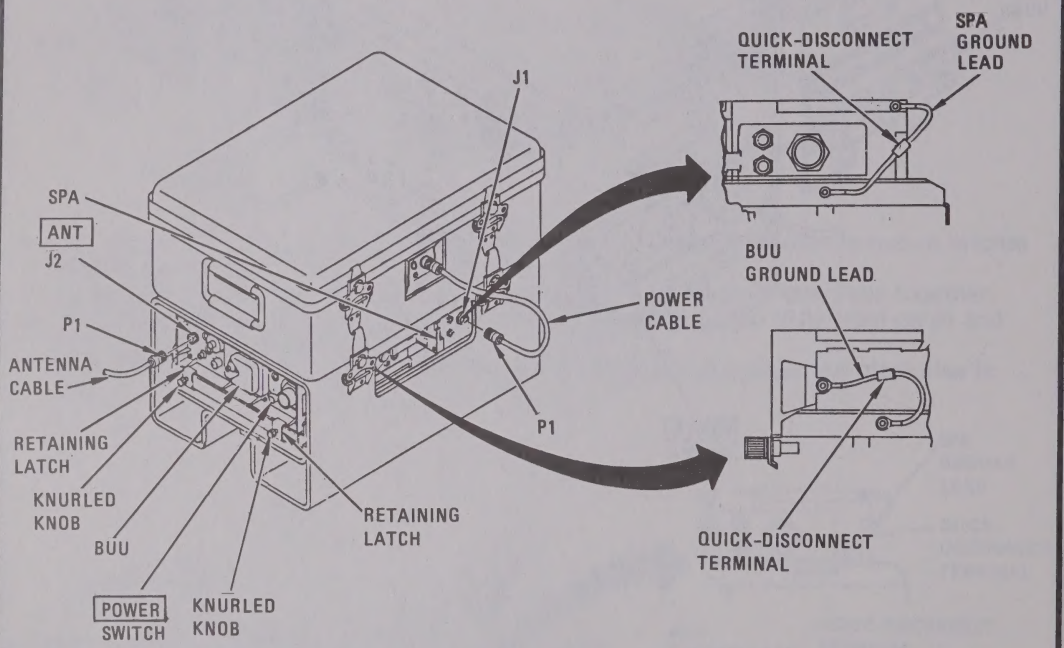
8. On BUU front panel, set **POWER** switch to **ON + AUDIBLE**.
9. Perform test according to procedure on pages 2-31 thru 2-38.



REPLACEMENT OF AUXILIARY GROUND UNIT SPA (1 of 4)

REMOVAL

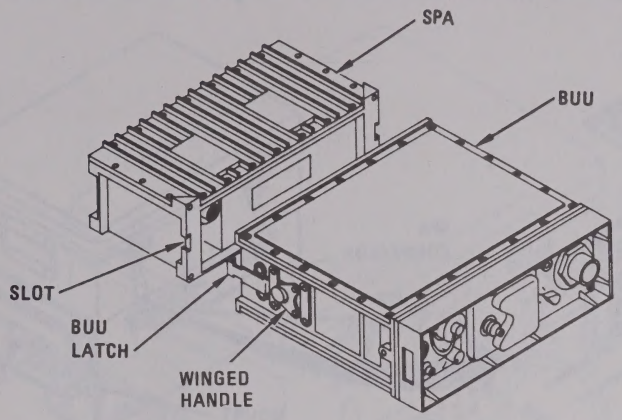
1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
2. Turn connector nut of connector P1 on power cable counterclockwise until free and unplug P1 from J1 on SPA.
3. Turn connector nut of connector P1 on antenna cable counterclockwise until free and unplug P1 from **ANT** connector J2 on BUU front panel.
4. Disconnect BUU and SPA ground leads at quick-disconnect terminals by pulling terminals apart.
5. Turn two knurled knobs counterclockwise until retaining latches are free and slide latches downward to clear BUU.
6. Slide BUU and SPA forward as a unit, remove from power adapter assembly housing, and lay on a flat, horizontal surface.



REPLACEMENT OF AUXILIARY GROUND UNIT SPA (2 of 4)

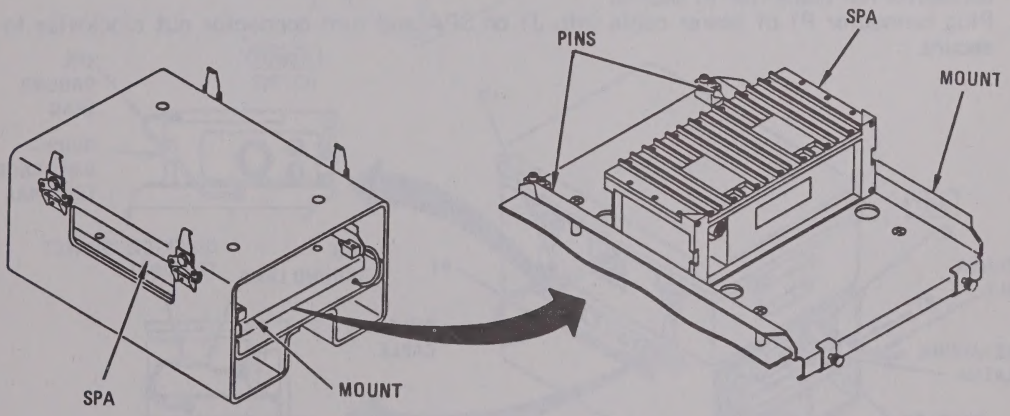
REMOVAL (cont)

7. Lift two winged handles and turn counterclockwise to release BUU latches.
8. Lift BUU latches to clear slots in SPA and pull BUU and SPA apart.



INSTALLATION

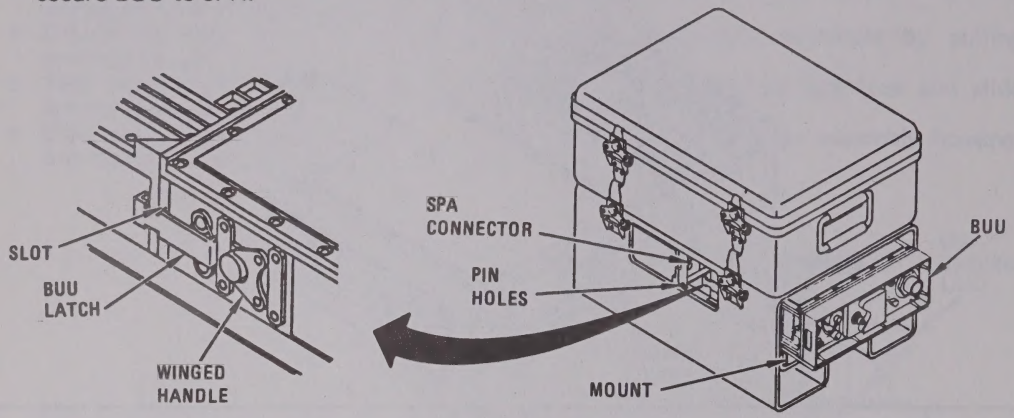
1. Set replacement SPA on mount and slide SPA to rear until pins on mount engage holes in rear of SPA.



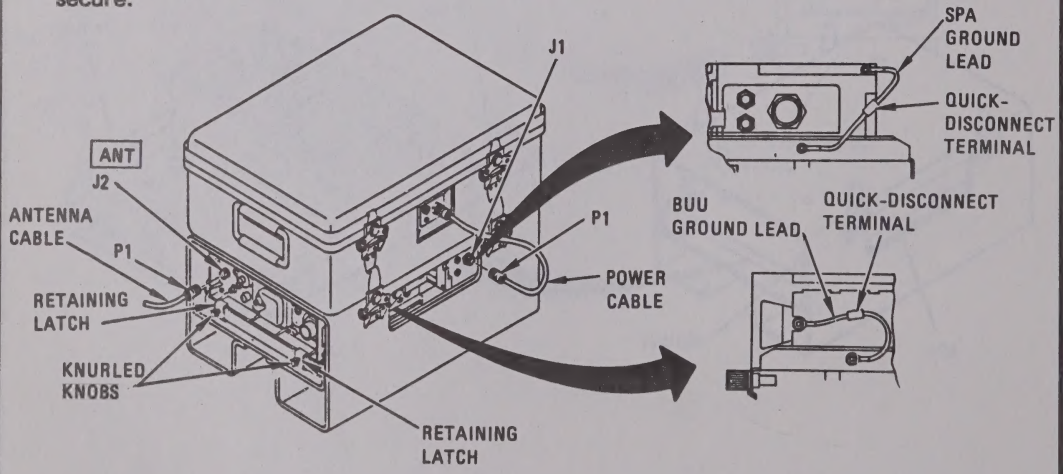
REPLACEMENT OF AUXILIARY GROUND UNIT SPA (3 of 4)

INSTALLATION (cont)

2. Place BUU on mount and slide BUU to rear making sure that connector on rear of BUU mates with connector on SPA and that four pins on rear of BUU enter holes in SPA.
3. Engage BUU latches with slots in SPA and lift winged handles and turn clockwise to secure BUU to SPA.



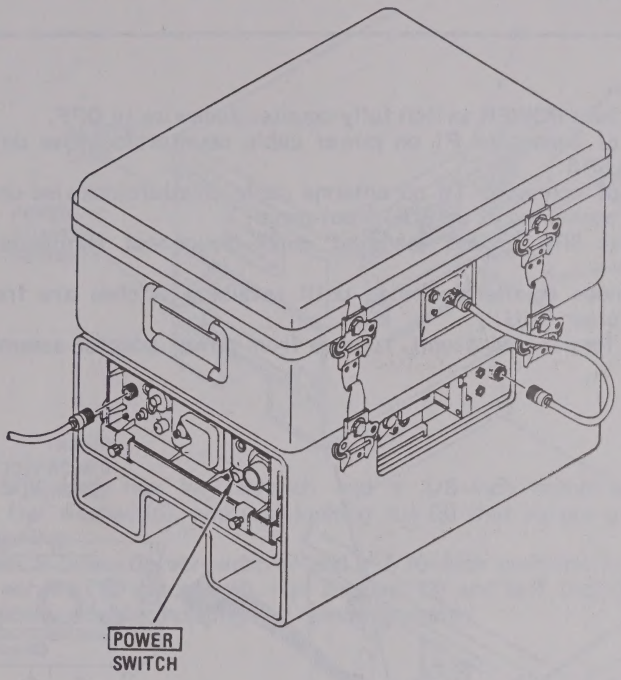
4. Lift retaining latches to engage BUU and turn knurled knobs clockwise to secure latches in this position.
5. Connect BUU and SPA ground leads by snapping quick-disconnect terminals together.
6. Plug connector P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
7. Plug connector P1 of power cable into J1 on SPA and turn connector nut clockwise to secure.



REPLACEMENT OF AUXILIARY GROUND UNIT SPA (4 of 4)

INSTALLATION (cont)

8. On BUU front panel, set **POWER** switch to **ON + AUDIBLE.**
9. Perform test according to procedure on pages 2-31 thru 2-38.



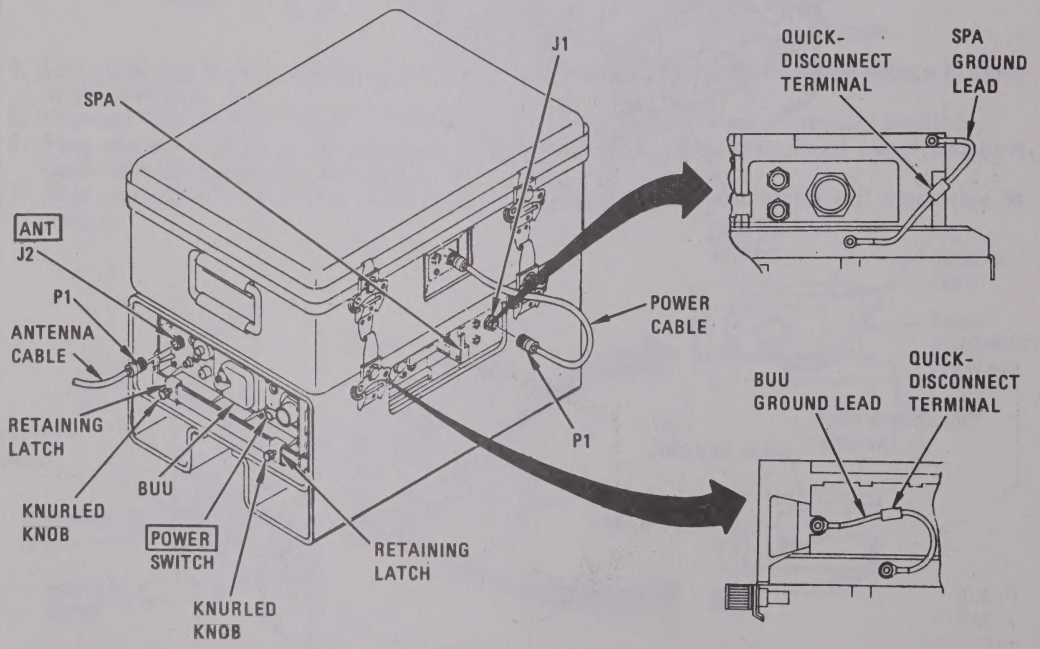
REPLACEMENT OF AUXILIARY GROUND UNIT MOUNT MT-6145/GRC-210 (1 of 5)

Tools:

No. 2 cross-tip screwdriver
5/32-inch hex key wrench
7/16-inch combination wrench
3/8-inch combination wrench

REMOVAL

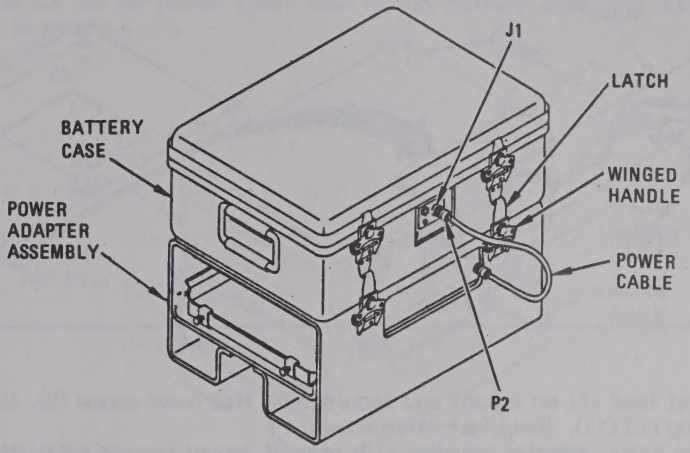
1. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
2. Turn connector nut of connector P1 on power cable counterclockwise until free and unplug P1 from J1 on SPA.
3. Turn connector nut of connector P1 on antenna cable counterclockwise until free and unplug P1 from **ANT** connector J2 on BUU front panel.
4. Disconnect BUU and SPA ground leads at quick-disconnect terminals by pulling terminals apart.
5. Turn two knurled knobs counterclockwise until retaining latches are free and slide latches downward to clear BUU.
6. Slide BUU and SPA forward as a unit, remove from power adapter assembly housing, and set aside.



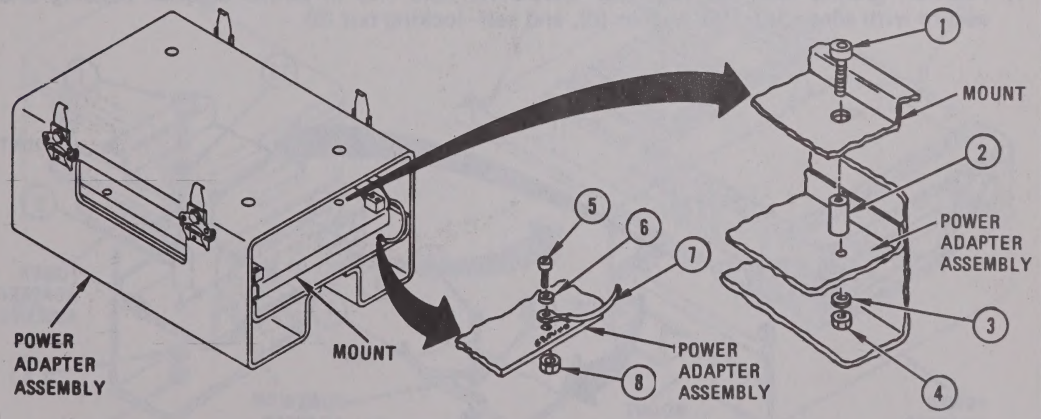
REPLACEMENT OF AUXILIARY GROUND UNIT MOUNT MT-6145/GRC-210 (2 of 5)

REMOVAL (cont)

7. Turn connector nut of P2 on power cable counterclockwise until free, and unplug P2 from connector J1 on battery case. Set power cable aside.
8. Lift winged handles on four latches and turn counterclockwise to free latches.
9. Disengage four latches from battery case and lift battery case from power adapter assembly.



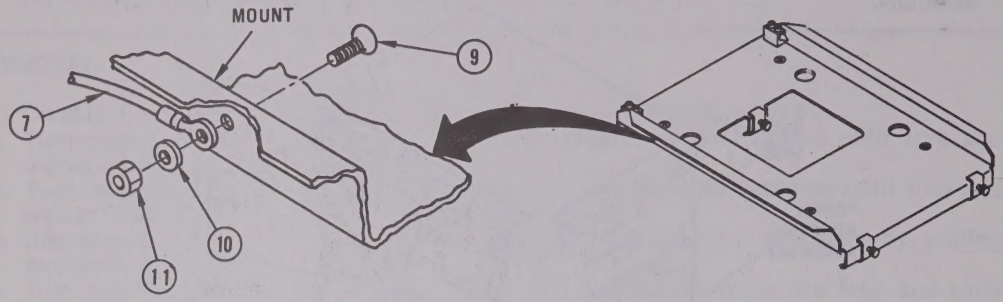
10. Using a 5/32-inch hex key wrench and a 3/8-inch combination wrench, remove screw (5), flat washer (6), and self-locking nut (8) that secure ground lead (7) to power adapter housing.
11. Using a No. 2 cross-tip screwdriver and a 7/16-inch combination wrench, remove four flat head screws (1), spacers (2), flat washers (3) and self-locking nuts (4) that secure mount to power adapter housing and remove mount.



REPLACEMENT OF AUXILIARY GROUND UNIT MOUNT MT-6145/GRC-210 (3 of 5)

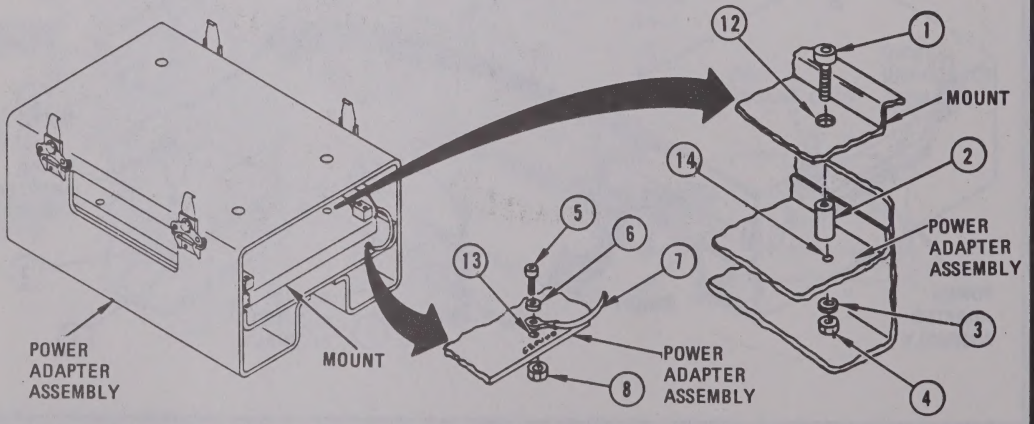
REMOVAL (cont)

12. Using a No. 2 cross-tip screwdriver and a 3/8-inch combination wrench, remove flat head screw (9), flatwasher (10), and self-locking nut (11) that secure ground lead (7) to side of mount and lay aside for installation on replacement mount.



INSTALLATION

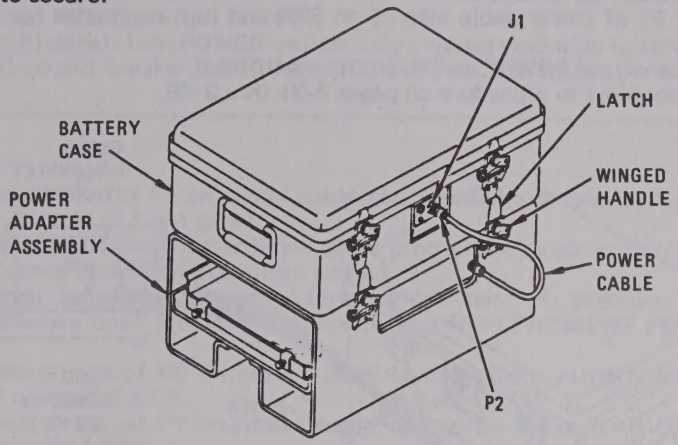
1. Position ground lead (7) on mount and secure with flat head screw (9), flatwasher (6), and self-locking nut (11). See illustration above.
2. Place mount in power adapter housing with rear of mount toward **GROUND** connection (13) on power adapter housing.
3. Lift mount and position spacer (2) under each of four mounting holes (12).
4. Install flat head screw (1) through mounting hole (12) in mount, through spacer (2), and through mounting hole (14) in power adapter housing in each of four mounting points.
5. Install flatwasher (3) and self-locking nut (4) on each of four screws.
6. Using No. 2 cross-tip screwdriver and 7/16-inch combination wrench, tighten each of four flat head screws (1).
7. Position ground lead (7) lug over **GROUND** hole (13) in power adapter housing and secure with screw (5), flat washer (6), and self-locking nut (8).



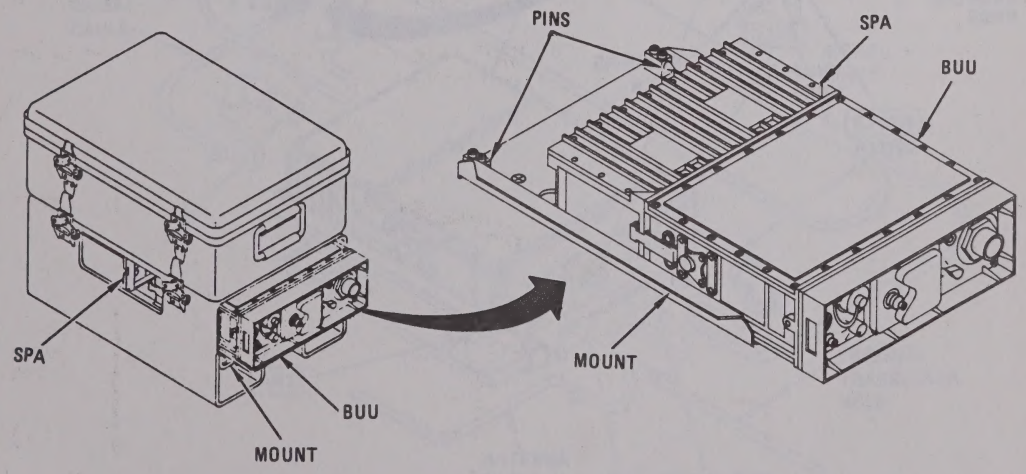
REPLACEMENT OF AUXILIARY GROUND UNIT MOUNT MT-6145/GRC-210 (4 of 5)

INSTALLATION (cont)

8. Place battery case on top of power adapter assembly and engage four latches with hooks on battery case.
9. Lift winged handles on four latches and turn clockwise to secure latches.
10. Plug connector P2 on power cable into J1 on battery case and turn connector nut clockwise to secure.



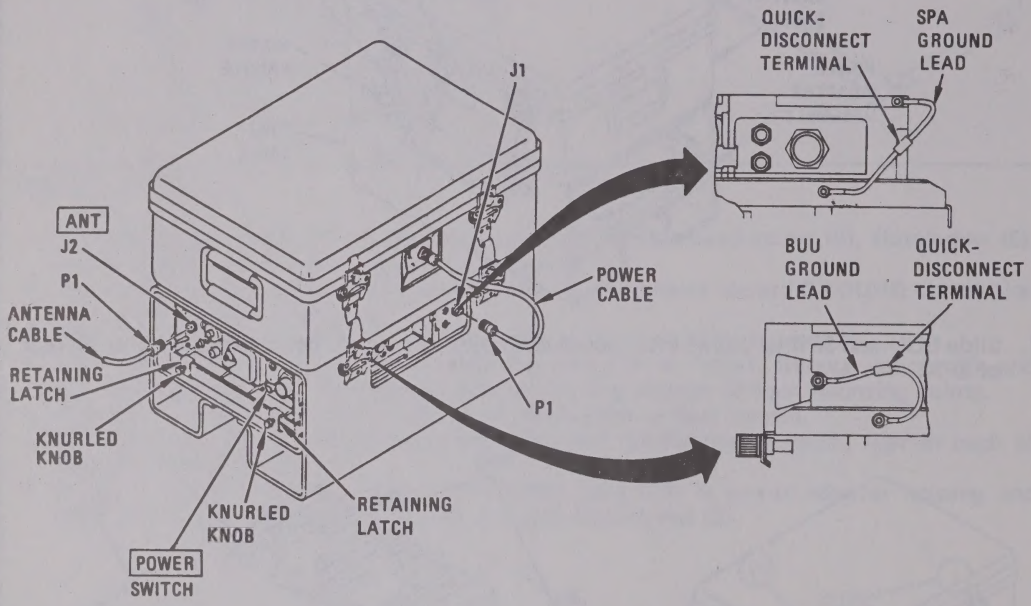
11. Slide BUU and SPA as a unit into mount until pins at rear of mount engage holes at rear of SPA.



REPLACEMENT OF AUXILIARY GROUND UNIT MOUNT MT-6145/GRC-210 (5 of 5)

INSTALLATION (cont)

12. Lift retaining latches to engage BUU and turn knurled knobs clockwise to secure latches in this position.
13. Connect BUU and SPA ground leads by snapping quick-disconnect terminals together.
14. Plug connector P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
15. Plug connector P1 of power cable into J1 on SPA and turn connector nut clockwise to secure.
16. On BUU front panel, set **POWER** switch to **ON + AUDIBLE**.
17. Perform test according to procedure on pages 2-31 thru 2-38.



REPLACEMENT OF AIRBORNE UNIT BUU (1 of 6)

Tools:

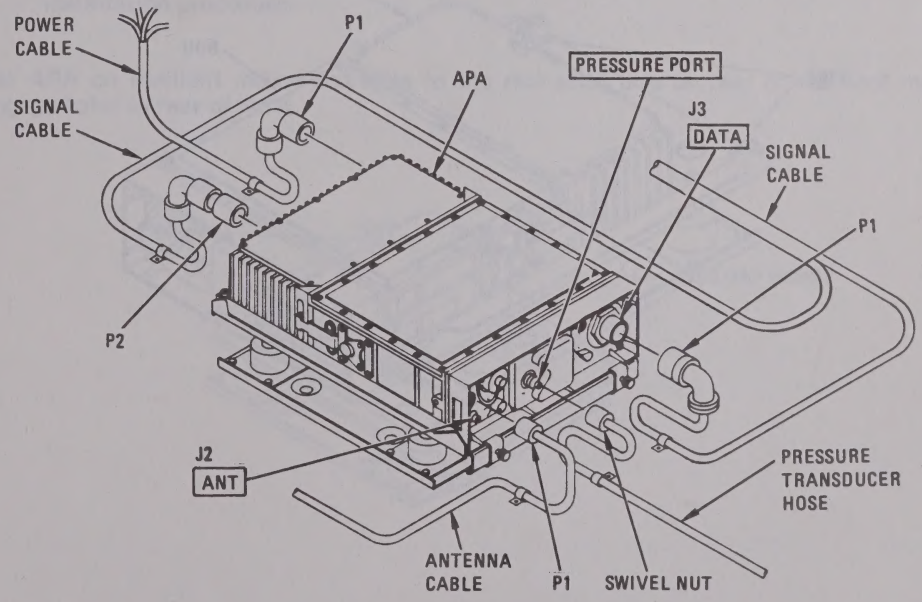
6-inch adjustable wrench
5/32-inch hex key wrench

INITIAL SETUP

1. On PCDP, set **POWER** switch to **OFF**.
2. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
3. On aircraft circuit breaker panel, pull out PLRS circuit breaker(s).

REMOVAL

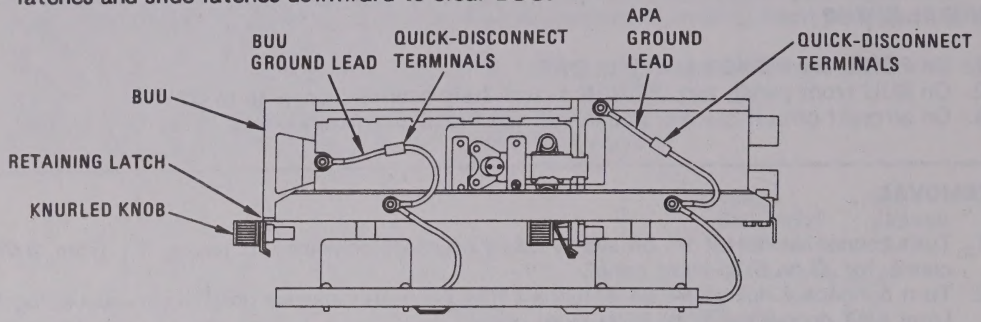
1. Turn connector nut of P1 on signal cable counterclockwise and unplug P1 from **DATA** connector J3 on BUU front panel.
2. Turn connector nut of P1 on antenna cable counterclockwise until free and unplug P1 from **ANT** connector J2 on BUU front panel.
3. Using 6-inch adjustable wrench, turn swivel nut on pressure transducer hose counterclockwise until free and disconnect hose from **PRESSURE PORT** on BUU front panel.
4. Turn connector nut of P2 on signal cable counterclockwise until free and unplug P2 from A2J2 on rear of APA.
5. Turn connector nut of P1 on power cable counterclockwise until free and unplug P1 from J1 on rear of APA.



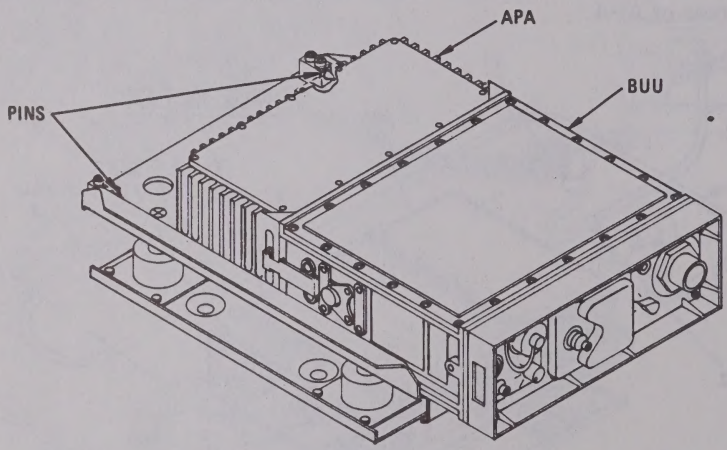
REPLACEMENT OF AIRBORNE UNIT BUU (2 of 6)

REMOVAL (cont)

6. Disconnect BUU and APA ground leads at quick-disconnect terminals by pulling terminals apart.
7. Turn two knurled knobs on front of resilient mount counterclockwise to free retaining latches and slide latches downward to clear BUU.



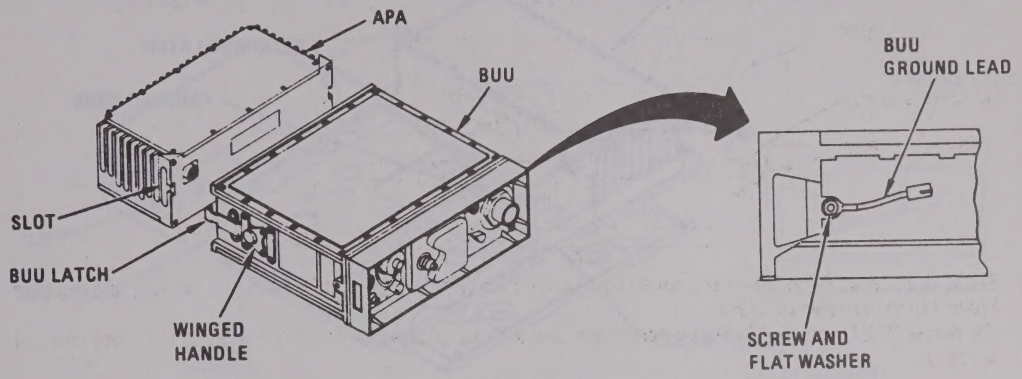
8. Slide BUU and APA forward as a unit until two pins at rear of resilient mount disengage from holes in rear of APA.
9. Remove BUU and APA from resilient mount as a unit and place on a flat horizontal surface.



REPLACEMENT OF AIRBORNE UNIT BUU (3 of 6)

REMOVAL (cont)

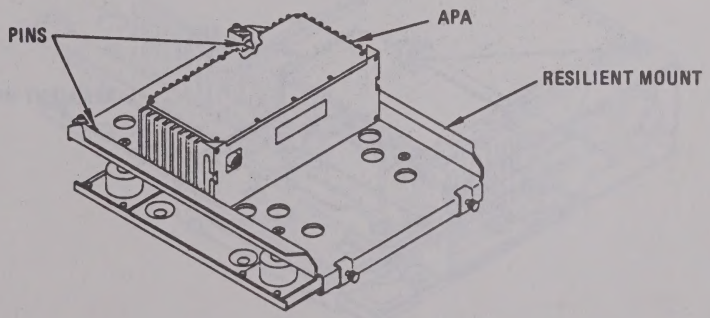
10. Using a 5/32-inch hex key wrench, remove screw and flat washer and remove ground lead from BUU. Retain screw, washer, and ground lead for installation on replacement BUU.
11. Lift two winged handles on BUU latches and turn counterclockwise to free latches.
12. Disengage BUU latches from slots in APA and carefully pull BUU and APA apart.



NOTE

If replacement BUU is to be installed right away, skip to step 3 of installation procedure.

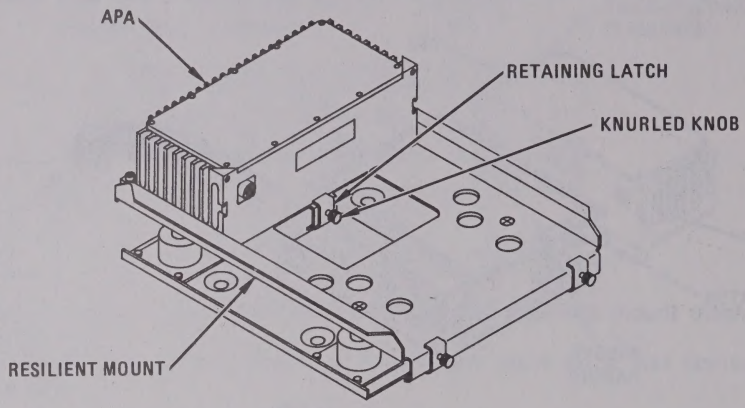
13. Set APA on resilient mount and slide to the rear until pins on rear of resilient mount engage holes in rear of APA.



REPLACEMENT OF AIRBORNE UNIT BUU (4 of 6)

REMOVAL (cont)

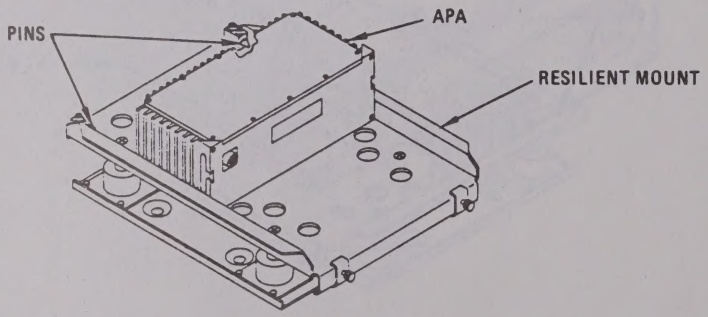
14. In center of resilient mount, turn knurled knob counterclockwise to free retaining latch and slide latch upward to engage APA; then turn knurled knob clockwise to secure latch in upward position.



INSTALLATION

1. Turn knurled knob counterclockwise to free retaining latch and slide latch downward to its lowest position; then turn knurled knob clockwise to secure retaining latch in this position. See illustration above.

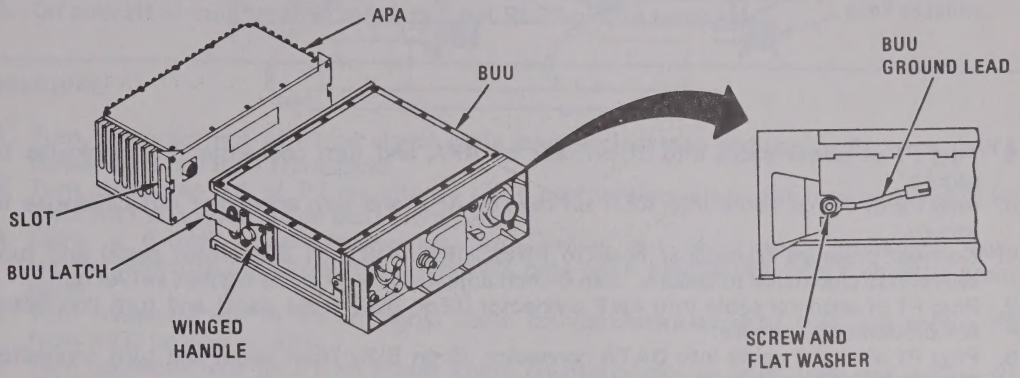
2. Slide APA forward until pins at rear of resilient mount disengage from holes in rear of APA, remove APA from resilient mount, and set on a flat horizontal surface.



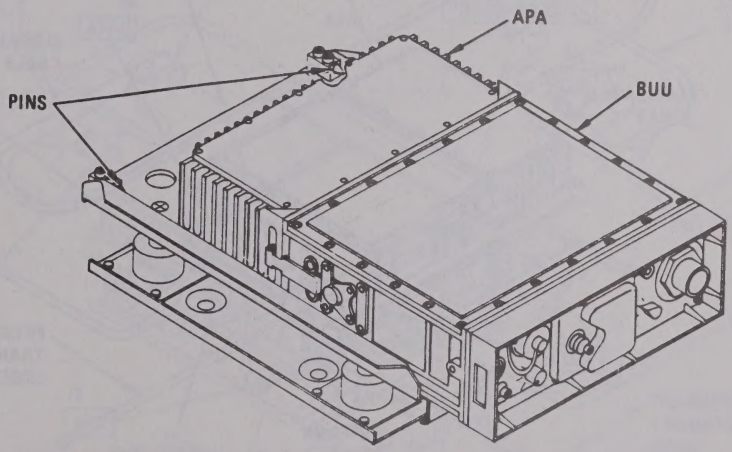
REPLACEMENT OF AIRBORNE UNIT BUU (5 of 6)

INSTALLATION (cont)

3. Set BUU on flat horizontal surface in front of APA and slide BUU and APA together making sure that connector on rear of BUU mates with connector J2 on APA and that four pins on rear of BUU enter pin holes in APA.
4. Engage two BUU latches with slots in APA and turn winged handles clockwise to secure BUU to APA.
5. Position BUU ground lead on BUU and secure with screw and flat washer.



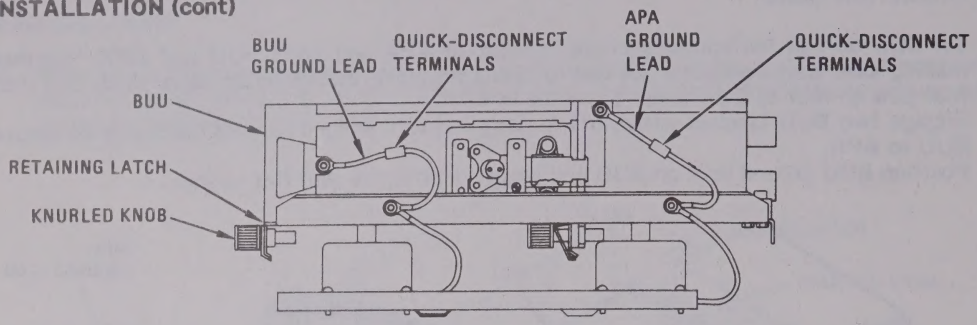
6. Place BUU and APA assembly on resilient mount and slide to the rear so that pins on rear of resilient mount enter holes in rear of APA.



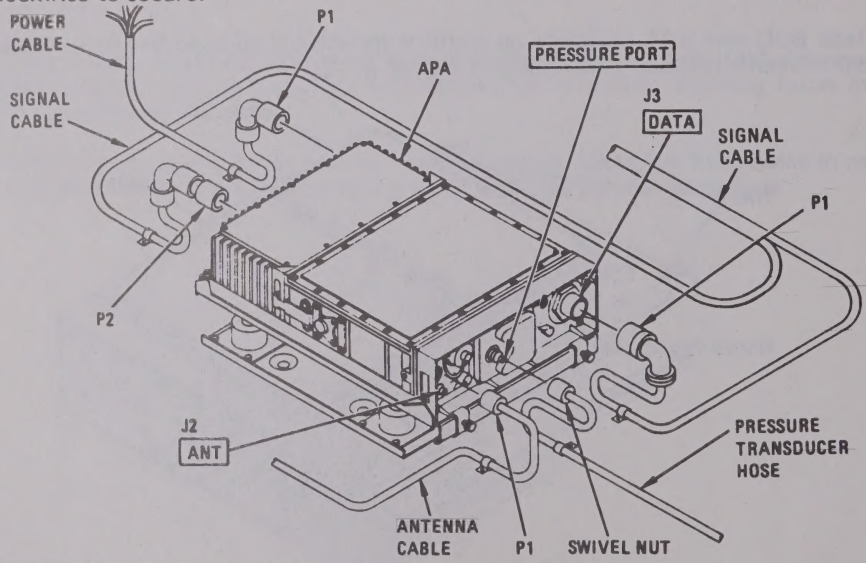
7. Lift two retaining latches so that they engage BUU and turn knurled knobs clockwise to secure retaining latches in this position.
8. Connect BUU and APA ground leads by snapping two halves of quick-disconnect terminals together.

REPLACEMENT OF AIRBORNE UNIT BUU (6 of 6)

INSTALLATION (cont)



9. Plug P1 of power cable into J1 on rear of APA and turn connector nut clockwise to secure.
10. Plug P2 of signal cable into A2J1 on rear of APA and turn connector nut clockwise to secure.
11. Connect pressure transducer hose to **PRESSURE PORT** on BUU front panel and turn swivel nut clockwise to secure. Use 6-inch adjustable wrench to tighten swivel nut.
12. Plug P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
13. Plug P1 of signal cable into **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.



14. On aircraft circuit breaker panel, push in PLRS circuit breaker(s).
15. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
16. On PCDP, set **POWER** switch to **ON**.
17. Perform test according to procedure on pages 2-44 thru 2-52.

REPLACEMENT OF AIRBORNE UNIT APA (1 of 5)

Tools:

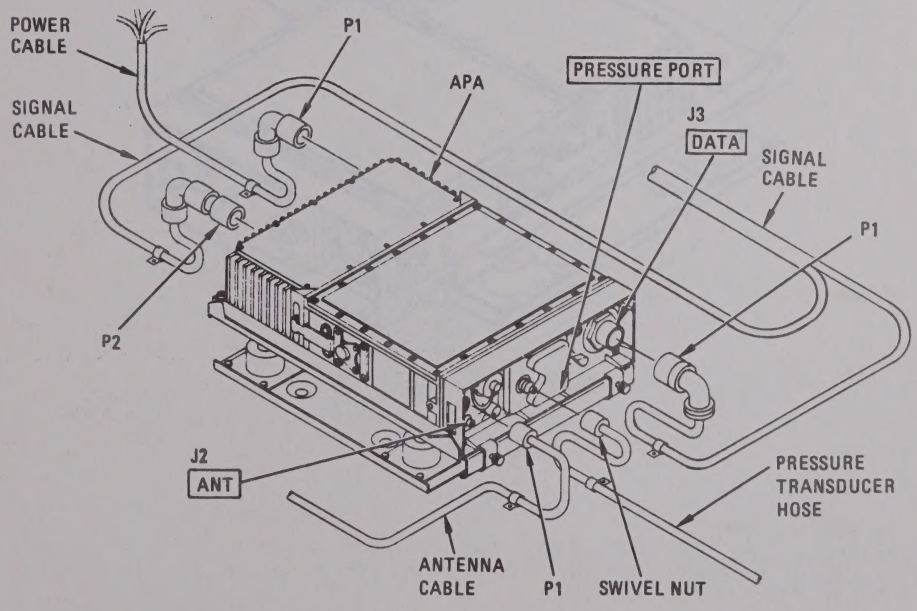
6-inch adjustable wrench

INITIAL SETUP

1. On PCDP, set **POWER** switch to **OFF**.
2. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
3. On aircraft circuit breaker panel, pull out PLRS circuit breaker(s).

REMOVAL

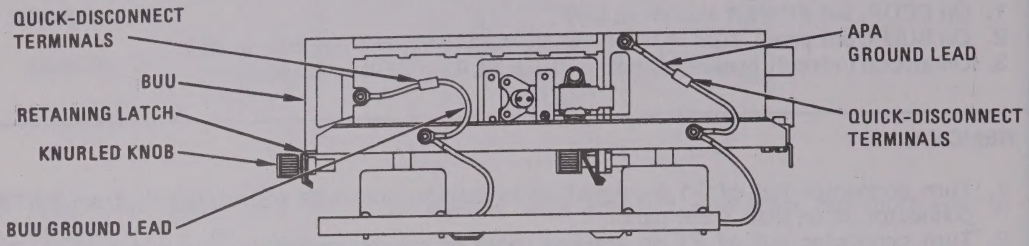
1. Turn connector nut of P1 on signal cable counterclockwise and unplug P1 from **DATA** connector J3 on BUU front panel.
2. Turn connector nut of P1 on antenna cable counterclockwise until free and unplug P1 from **ANT** connector J2 on BUU front panel.
3. Using a 6-inch adjustable wrench, turn swivel nut of pressure transducer hose counterclockwise until free and disconnect hose from **PRESSURE PORT** on BUU front panel.
4. Turn connector nut of P2 on signal cable counterclockwise until free and unplug P2 from A2J2 on rear of APA.
5. Turn connector nut of P1 on power cable counterclockwise until free and unplug P1 from J1 on rear of APA.



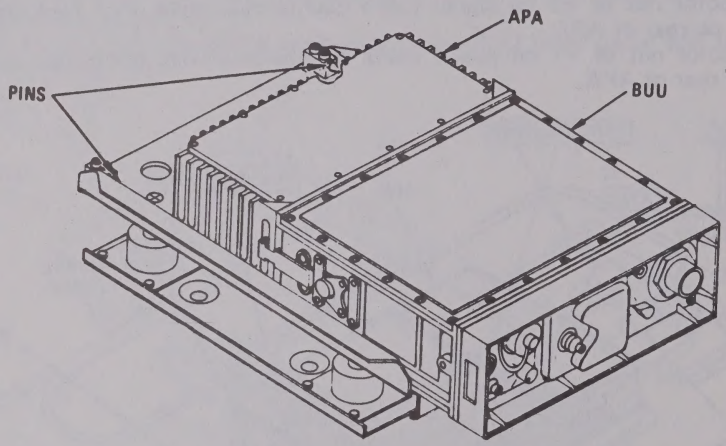
REPLACEMENT OF AIRBORNE UNIT APA (2 of 5)

REMOVAL (cont)

6. Disconnect BUU and APA ground leads at quick-disconnect terminals by pulling terminals apart.
7. Turn two knurled knobs on front of resilient mount counterclockwise to free retaining latches and slide latches downward to clear BUU.



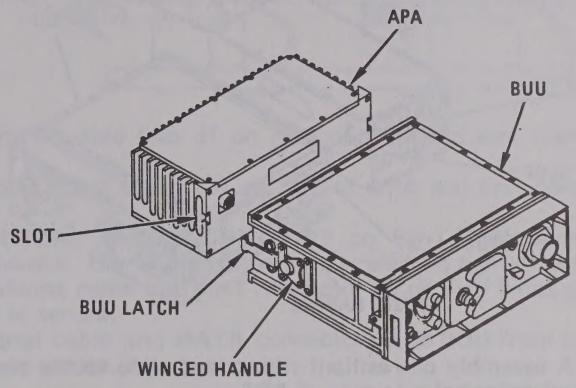
8. Slide BUU and APA forward as a unit until two pins at rear of resilient mount disengage from holes in rear of APA.



REPLACEMENT OF AIRBORNE UNIT APA (3 of 5)

REMOVAL (cont)

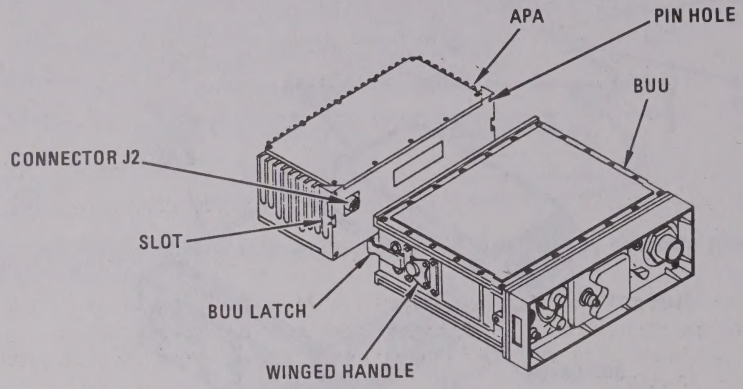
9. Remove BUU and APA from resilient mount as a unit and place on a flat horizontal surface.
10. Lift two winged handles on BUU latches and turn counterclockwise to free latches.
11. Disengage BUU latches from slots in APA and carefully pull BUU and APA apart.



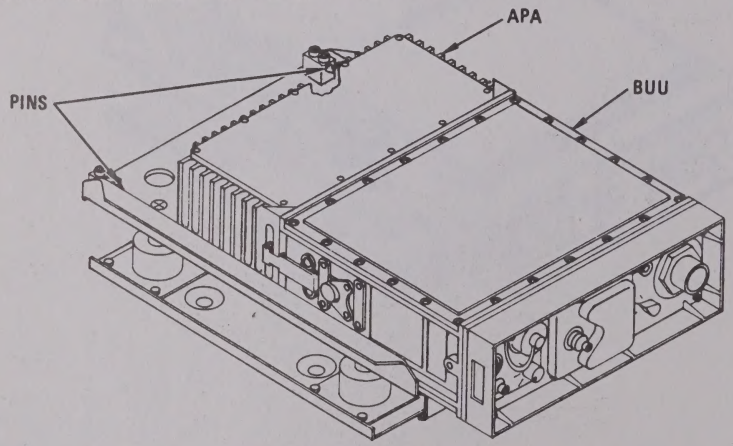
REPLACEMENT OF AIRBORNE UNIT APA (4 of 5)

INSTALLATION

1. Set replacement APA on a flat horizontal surface behind BUU.
2. Slide APA and BUU together making sure that connector on rear of BUU mates with connector J2 on APA and that four pins on rear of BUU enter holes in APA.
3. Engage BUU latches with slots in APA and turn winged handles clockwise approximately 1/2 turn to secure BUU to APA.



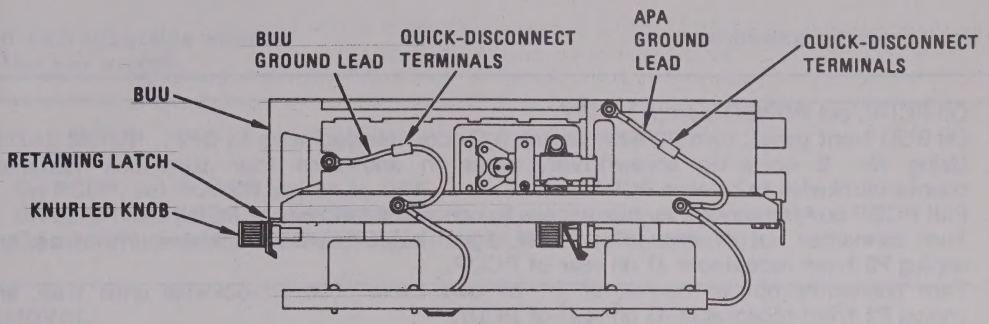
4. Place BUU and APA assembly on resilient mount and slide to the rear so that pins on rear of resilient mount enter holes in rear of APA.



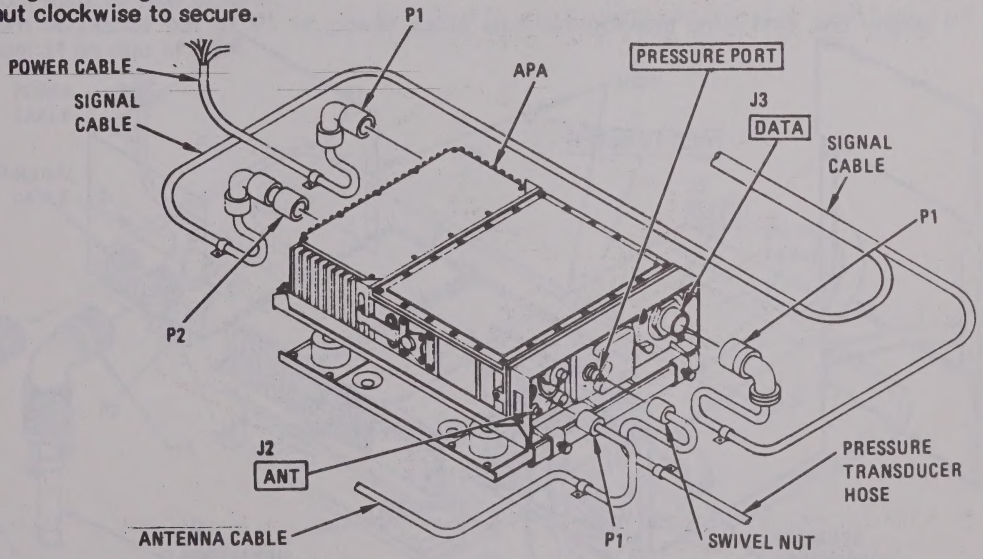
5. Slide two retaining latches upward to engage BUU and turn knurled knobs clockwise to secure latches in this position.
6. Connect BUU and APA ground leads by snapping two halves of quick-disconnect terminals together.

REPLACEMENT OF AIRBORNE UNIT APA (5 of 5)

INSTALLATION (cont)



7. Plug P1 of power cable into J1 on rear of APA and turn connector nut clockwise to secure.
8. Plug P2 of signal cable into A2J1 on rear of APA and turn connector nut clockwise to secure.
9. Connect pitot hose to **PRESSURE PORT** on BUU front panel and turn swivel nut clockwise to secure. Use 6-inch adjustable wrench to tighten swivel nut.
10. Plug P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
11. Plug P1 of signal cable into **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.



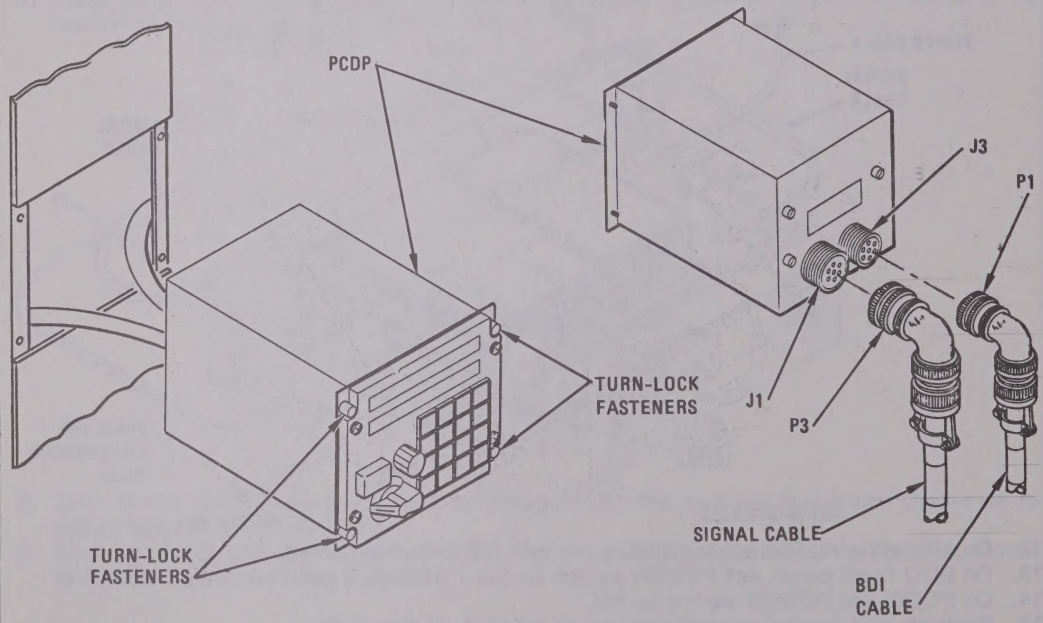
12. On aircraft circuit breaker panel, push in PLRS circuit breakers.
13. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
14. On PCDP, set **POWER** switch to **ON**.
15. Perform test according to procedure on pages 2-44 thru 2-52.

REPLACEMENT OF AIRBORNE UNIT PCDP

Tools:

No. 2 cross-tip screwdriver

1. On PCDP, set **POWER** switch to **OFF**.
2. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
3. Using No. 2 cross-tip screwdriver, press in and turn four turn-lock fasteners counterclockwise to release PCDP.
4. Pull PCDP out far enough to gain access to connectors at rear of PCDP.
5. Turn connector nut of connector P3 of signal cable counterclockwise until free, and unplug P3 from receptacle J1 on rear of PCDP.
6. Turn connector nut of connector P1 of BDI cable counterclockwise until free, and unplug P1 from receptable J3 on rear of PCDP.
7. Plug connector P1 of BDI cable into receptacle J3 on replacement PCDP and turn connector nut clockwise to secure.
8. Plug connector P3 of signal cable into receptacle J1 on replacement PCDP and turn connector nut clockwise to secure.
9. Position replacement PCDP in aircraft panel and using No. 2 cross-tip screwdriver, press in four turn-lock fasteners and turn clockwise to secure PCDP in aircraft panel.
10. On BUU front panel set **POWER** switch to **ON + AUDIBLE** position.
11. On PCDP, set **POWER** switch to **ON**.
12. Perform test according to procedure on pages 2-44 thru 2-52.



REPLACEMENT OF AIRBORNE UNIT RESILIENT MOUNT (1 of 4)

Tools:

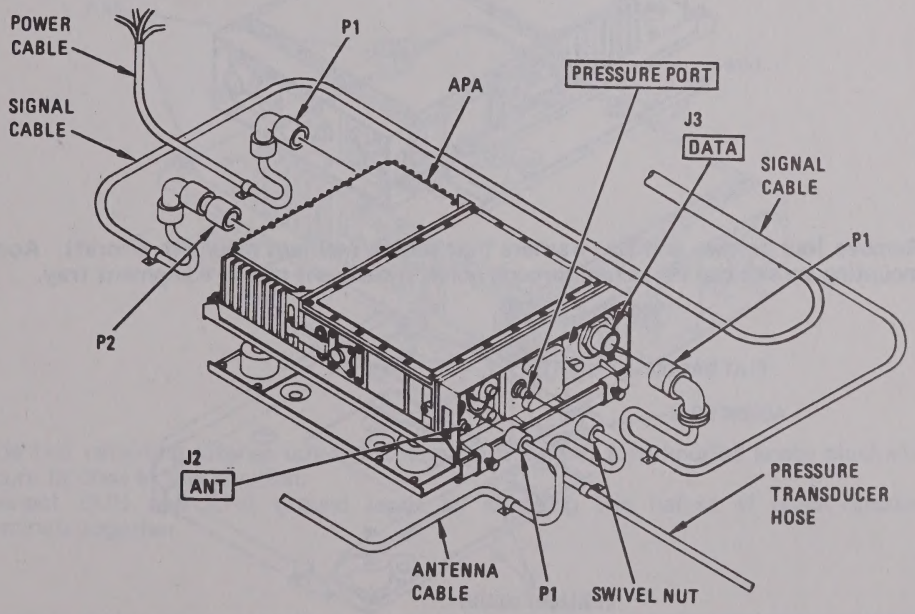
6-inch adjustable wrench
Hex key wrench

INITIAL SETUP

1. On PCDP, set **POWER** switch to **OFF**.
2. On BUU front panel, turn **POWER** switch fully counterclockwise to **OFF**.
3. On aircraft circuit breaker panel, pull out PLRS circuit breaker(s).

REMOVAL

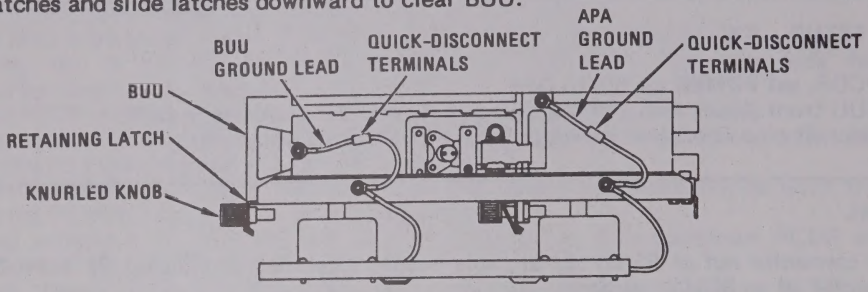
1. Turn connector nut of P1 on signal cable counterclockwise and unplug P1 from **DATA** connector J3 on BUU front panel.
2. Turn connector nut of P1 on antenna cable counterclockwise until free and unplug P1 from **ANT** connector J2 on BUU front panel.
3. Using a 6-inch adjustable wrench, turn swivel nut on pressure transducer hose counterclockwise until free and disconnect hose from **PRESSURE PORT** on BUU front panel.
4. Turn connector nut of P2 on signal cable counterclockwise until free and unplug P2 from A2J2 on rear of APA.
5. Turn connector nut of P1 on power cable counterclockwise until free and unplug P1 from J1 on rear of APA.



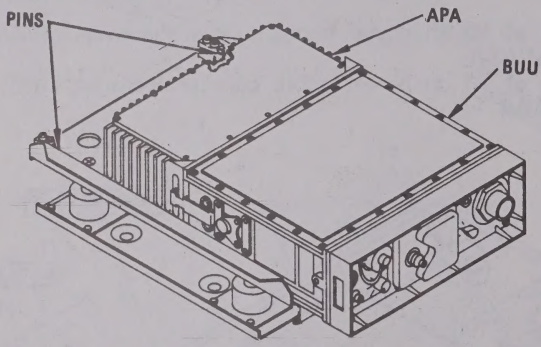
REPLACEMENT OF AIRBORNE UNIT RESILIENT MOUNT (2 of 4)

REMOVAL (cont)

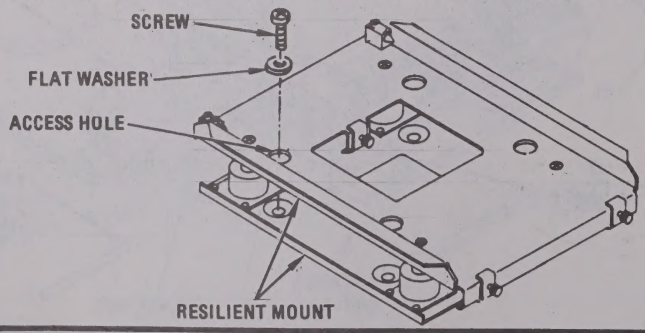
6. Disconnect BUU and APA ground leads at quick-disconnect terminals by pulling terminals apart.
7. Turn two knurled knobs on front of resilient mount counterclockwise to free retaining latches and slide latches downward to clear BUU.



8. Slide BUU and APA forward as a unit until two pins at rear of resilient mount disengage from holes in rear of APA.
9. Remove BUU and APA from resilient mount as a unit and set aside.



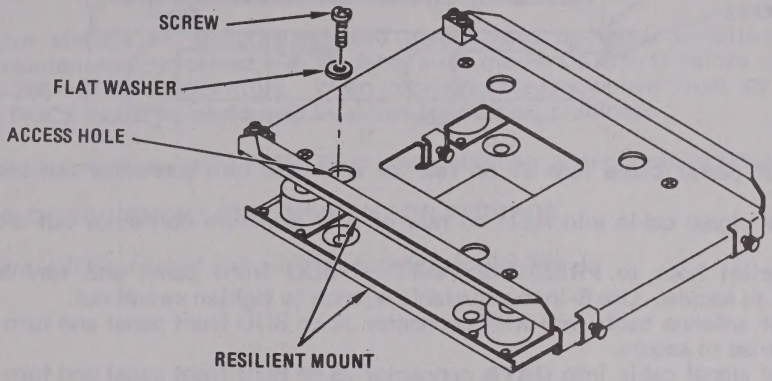
10. Remove four screws and flat washers that secure resilient mount to aircraft. Access to mounting screws can be gained through holes in resilient mount equipment tray.



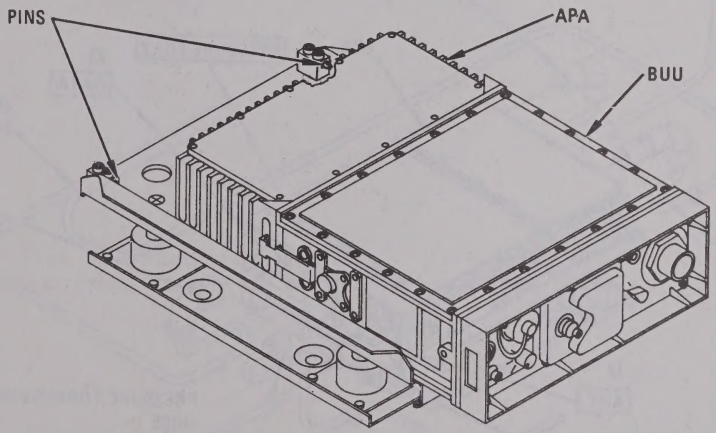
REPLACEMENT OF AIRBORNE UNIT RESILIENT MOUNT (3 of 4)

INSTALLATION

1. Clean all corrosion, oxidation, paint, or any other substance from mounting feet of resilient mount and from mating area in aircraft to ensure good electrical contact.
2. Position resilient mount in aircraft alining mounting holes in resilient mount with mounting holes in aircraft.
3. Secure resilient mount to aircraft with four screws and flat washers. The mounting screws can be tightened through access holes in resilient mount equipment tray.



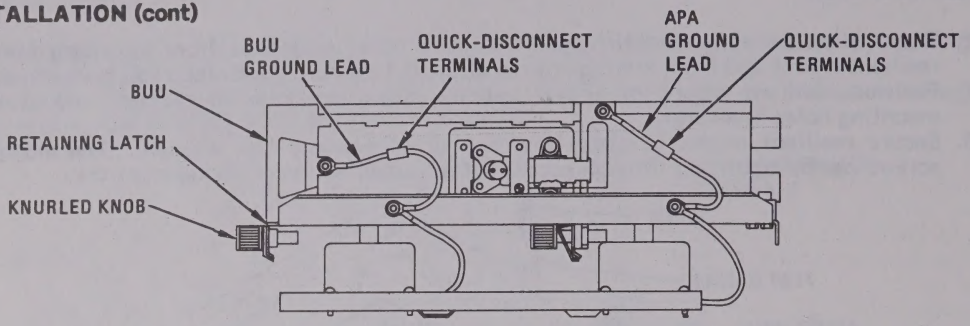
4. Place BUU and APA assembly on resilient mount and slide to the rear so that pins on rear of resilient mount enter holes in rear of APA.



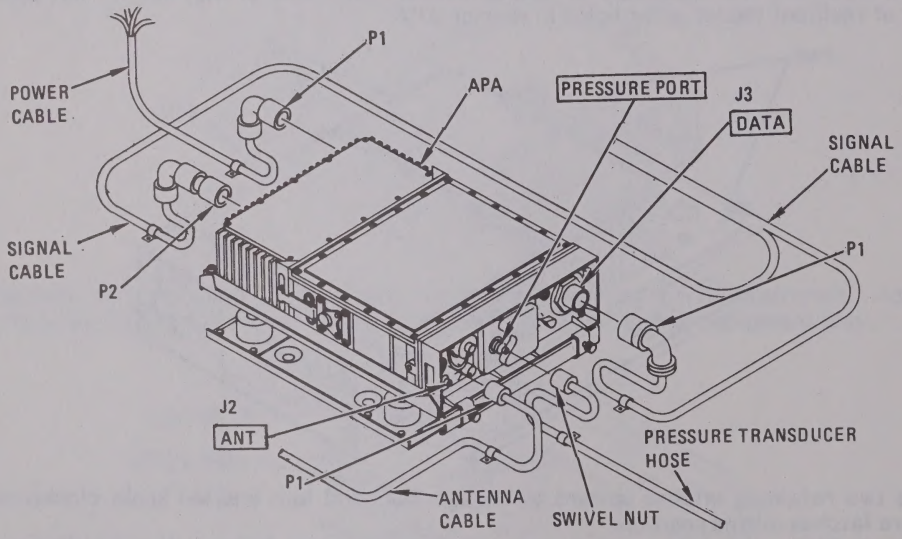
5. Slide two retaining latches upward to engage BUU and turn knurled knobs clockwise to secure latches in this position.
6. Connect BUU and APA ground leads by snapping two halves of quick-disconnect terminals together.

REPLACEMENT OF AIRBORNE UNIT RESILIENT MOUNT (4 of 4)

INSTALLATION (cont)



7. Plug P1 of power cable into J1 on rear of APA and turn connector nut clockwise to secure.
8. Plug P2 of signal cable into A2J1 on rear of APA and turn connector nut clockwise to secure.
9. Connect pitot hose to **PRESSURE PORT** on BUU front panel and turn swivel nut clockwise to secure. Use 6-inch adjustable wrench to tighten swivel nut.
10. Plug P1 of antenna cable into **ANT** connector J2 on BUU front panel and turn connector nut clockwise to secure.
11. Plug P1 of signal cable into **DATA** connector J3 on BUU front panel and turn connector nut clockwise to secure.



12. On aircraft circuit breaker panel, push in PLRS circuit breakers.
13. On BUU front panel, set **POWER** switch to **ON + AUDIBLE** position.
14. On PCDP, set **POWER** switch to **ON**.
15. Perform test according to procedure on pages 2-44 thru 2-52.

Section V. PREPARATION FOR STORAGE OR SHIPMENT

PREPARATION

Before shipment or storage in excess of 30 days, batteries must be removed from the following items. See TM 11-5825-269-10/TM 08848A-10/2.

Battery Case CY-7871/PSQ-4 (Manpack Battery Case)
Battery Case CY-7872/GRC-210 (AGU Battery Case)
Receiver-Transmitter RT-1343/TSQ-129 (Basic User Unit)

ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. See TM 11-5825-269-10/TM 08848A-10/2. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness.

Marine Corps personnel see MCO P4450.7 for preparation for administrative storage.

PACKAGING OF EQUIPMENT FOR SHIPMENT OR STORAGE

The equipment will be marked and packed according to AR 746-1.

APPENDIX A
REFERENCES (1 of 2)

AR 40-583	Medical Services Control of Potential Hazards to Health from Microwave and Radio Frequency Radiation
AR 55-38	Reporting of Transportation Discrepancies and Shipments
AR 735-11-2	Accounting for Lost, Damaged, and Destroyed Property
AR 746-1	Marking, Packing, and Shipment of Supplies and Equipment Packaging of Army Materiel for Shipment and Storage
CTA 50-970	Expendable Items (Except: Medical, Class V, Repair Parts and Heraldic Items)
DA PAM 310-1	Consolidated Index of Army Publications and Blank Forms
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
MCO 4430.3F	Reporting of Item and Packaging Discrepancies
MCO P4450.7	Marine Corps Warehousing Manual
MCO P4610.19D	Transportation and Travel Report of Transportation Discrepancies
MCO 4855.10	Quality Deficiency Report

APPENDIX A
REFERENCES (2 of 2)

TM 11-5825-269-10/ TM 08848A-10/2	Operator's Manual, Manpack Radio Set AN/PSQ-4 (NSN - - -), Vehicle Radio Set AN/VSQ-1 (NSN - - -), Ground Radio Set AN/GRC-210 used with Position Location Reporting System AN/USQ-90
TM 11-5825-269-20P TM 08848A-20P/1	Organizational Maintenance Repair Parts and Special Tools List, Manpack Radio Set AN/PSQ-4 (NSN - - -), Vehicle Radio Set AN/VSQ-1 (NSN - - -), Ground Radio Set AN/GRC-210 (NSN - - -), Airborne Radio Set AN/ASQ-177(V)1 (NSN - - -), Airborne Radio Set AN/ASQ-177(V)2 (NSN - - -) used with Position Location Reporting System AN/USQ-90.
TM 43-0139	Painting Instructions for Field Use
TM 740-90-1	Administrative Storage of Equipment
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)
TM 750-244-6	Tactical Combat Vehicles
TM 4700-15/1	Equipment Record Procedures (Maintenance Forms, Records, and Reports)

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section 1. INTRODUCTION

GENERAL

This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories. The maintenance allocation chart (MAC) in section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions upon the end item or component shall be consistent with the assigned maintenance categories. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows.

Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

Test. To verify serviceability by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

Service. To perform operations required periodically to keep an item in proper operating condition; ie, to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

Adjust. To maintain an item by setting the operating characteristics to specified parameters.

Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

Install. To emplace, seat, or fix into position an item, part, or module (component or assembly) in a manner that allows the proper functioning of a piece of equipment or system.

Replace. To substitute a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

Repair. To apply maintenance services (inspect, test, service, adjust, aline, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in part, subassembly, module (component or assembly), end item, or system.

Overhaul. To restore an item to a completely serviceable/operational condition as prescribed by maintenance standards in appropriate technical publications (ie, DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

EXPLANATION OF COLUMNS IN THE MAC, SECTION II

Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph Maintenance Functions.)

Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C - Operator or crew
O - Organizational maintenance
F - Direct support maintenance
H - General support maintenance
D - Depot maintenance
L - An L in the H column of section II specifies that the function is to be performed at the designated Special Repair Activity (SRA)

Column 5, Tools and Equipment. Column 5 specifies by code those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

Column 6, Remarks. When applicable, this column shall contain a letter code in alphabetic order that shall be keyed to the remarks contained in section IV.

EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, section II, column 5.

Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool and test equipment.

Column 3, Nomenclature. Name or identification of the tool or test equipment.

Column 4, National/NATO Stock Number. The National/NATO stock number of the tool or test equipment.

Column 5, Tool Number. The manufacturer's part number.

EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

Column 1, Reference Code. The code recorded in column 6, section II.

Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, section II.

APPENDIX B
SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
01	Manpack Unit (MPU) AN/PSQ-4	Inspect	0.1						
		Test	0.1						
		Repair	0.3						
		Service	0.1						
		Test		0.4				1,4,5	
		Repair		0.3					
		Test			0.2			1,4,5	
		Adjust			0.2			1,2,3,4,	
		Aline			0.2			1,3,4	
0101	Receiver-Transmitter RT-1343/TSQ-129 (Basic User Unit or BUU), SM-D-919601	Replace		0.1					
		Test			0.1			1,4	
		Adjust			0.2			1,2,3,4,	
		Aline			0.2			1,3,4	
		Repair			1.3			2,3,5,6	
		Overhaul					1.2	1,3,4,5 9,15, 22-27	
010101	BUU Enclosure Assy SM-E-919621	Inspect			0.1				
		Test			0.1			5	
		Adjust			0.1			3,5	
		Repair			1.4			2,3,6	
01010101	Interconnection Board A3005221	Replace			0.3			2,3,6	
		Test				0.5L		7	M
		Repair				1.4L		7	
0101010101	Power Interface Card, A3005211	Replace				0.2L		7	
		Repair				0.8L		7	A
010102	Control Panel Assy SM-D-919611	Test			0.3			5	
		Replace			0.3			2,3,6	
		Repair			3.3			2,3,6	
01010201	Pressure Transducer A3004895-1	Replace			0.3			2,3,6	
		Test					0.3		B
		Repair					0.5		B

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
010103	DC Power Converter SM-D-919641	Replace Test Repair			0.1	 0.5L 0.7L		3,6 7 7	M
01010301	DC Power Converter Subassy SM-D-918931	Replace Repair				0.2L 2.2L		7 7	A
0101030101	DC Power Converter-1 CCA, SM-D-919661	Replace Repair				0.2L 0.8L		7 7	A
0101030102	DC Power Converter-2 CCA, SM-D-913141	Replace Repair				0.3L 0.8L		7 7	A
0101020103	DC Power Converter-3 CCA, SM-D-913151	Replace Repair				0.2L 0.8L		7 7	A
010104	Power Amplifier Assy SM-D-913121	Replace Test Repair			0.2	 0.5L 2.7L		2,3,6 7 7	M
01010401	Power Amplifier Control-CCA SM-E-918681	Replace Repair				0.3L 0.8L		7 7	A
01010402	Preamplifier-CCA SM-D-913001	Replace Repair				0.3L 0.8L		7 7	A
01010403	Final Stage Driver-CCA SM-D-919261	Replace Repair				0.6L 0.8L		7 7	A

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
010105	Radio Frequency Assy SM-D-919541	Replace Test Repair			0.2		 0.5 0.7	2,3 9 8,9	 M
01010501	Radio Frequency-CCA SM-E-919671	Replace Repair					0.2 4.7	2 2,3,8	 A
0101050101	Discrete Component Assy-CCA A3005181	Replace Repair					1.1 1.0	2 8	 A
0101050102	Demodulator-CCA SM-D-912861	Replace Repair					0.6 1.0	3 8	 A
0101050103	Frequency Select Loop-CCA SM-D-911941	Replace Repair					0.4 0.8	2 8	 A
0101050104	Receiver/Exciter-CCA SM-E-913140	Replace Test Repair					0.7 0.5 0.7	2,3,8	 B B
010106	Signal Message Processor-CCA A3006101	Replace Test Repair			0.2		 0.5 2.4	3 9 8,9	 M
01010601	Message Processor-CCA A3006111	Replace Repair					0.7 0.8	6,8 8	 A
01010602	Signal Processor-CCA SM-D-919271	Replace Repair					0.7 0.8	6,8 8	 A
010107	TSEC/KGV-6 KGV-G/TSEC-(E2) SM-D-912821	Replace Repair			0.2			2	C J

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0102	Control-Readout Unit C-10830/PSQ-4 (User Readout or URO) SM-D-912831	Replace Test Repair		0.1		0.5L 0.8L		1 7	M
010201	Keyboard/Display A3005071	Replace Test Repair				0.3L 0.3L 1.9L		7 5 7	
01020101	Keyboard Panel SM-D-911133-1	Replace Test Repair				0.5L	 0.3 0.5	7	 B B
01020102	Readout Control Unit-CCA SM-D-912801	Replace Repair				0.5L 2.0L		7 7	 A
0102010201	Data Processor-CCA SM-D-912941	Replace Repair				0.5L 0.8L		7 7	 A
0102010202	Data Display-CCA SM-D-912931	Replace Repair				0.5L 0.8L		7 7	 A
0103	Manpack Unit Installation Kit A3004901	Repair		0.1					
010301	Battery Case CY-7871/PSQ-4 (Manpack Battery Case) SM-D-913015	Replace Repair		0.1	0.1			3	

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
02	Surface Vehicle Unit (SVU) AN/VSQ-1	Inspect	0.1						
		Test	0.1						
		Test		0.4				1,4,5	
		Repair		1.3				28	
		Test			0.2			1,4,5	
		Adjust			0.3			1,2,3,4,	
		Aline			0.3			1,3,4	
0201	Receiver-Transmitter RT-1343/TSQ-129 (Basic User Unit or BUU) SM-D-919601	Replace		0.1				28	D
0202	Control-Readout Unit C-10830/PSQ-4 (User Readout or URO) SM-D-912831	Replace		0.1					E
0203	Vehicle Installation Kit A3004921	Repair		0.1					
020301	Selectable Power Adapter (SPA) PP-7641/VSQ-1 SM-D-919521	Replace		0.1				28	M
		Test				0.5L		7	
		Repair				0.9L		7	
02030101	Power Adapter-CCA SM-D-919531	Replace				0.4L		7	
		Repair				0.8L		7	
020302	Resilient Mount MT-6146/VSQ-1 SM-E-912525	Replace		0.2				28	
		Repair			0.1			2,3	

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
020303	Antenna AS-3449/VSQ-1 A3005031	Replace Repair							
020304	Cable Assy, RF Antenna SM-C-911480	Replace Repair		0.1	 0.1			28 2,3,5	
020305	Cable Assy, Power A3004939	Inspect Test Replace Repair		0.1 0.1 0.1	 0.4			 5 28 2,3,5	
020306	Cable Assy, URO Extension A3004928	Replace Repair		0.1	 0.2			28 2,3,5	
03	Airborne Radio Set AN/ASQ-177(V)1 (Fixed Wing)	Inspect Test Test Repair Test Adjust Aline	0.1 0.1	 0.2 1.4	 0.2 0.3 0.3			 1,4,5 28 1,4,5 1,2,3,4, 1,3,4	
0301	Receiver-Transmitter RT-1343/TSQ-129 (BUU) SM-D-919601	Replace		0.1				28	D
0302	Control Display Panel C-10829/ ASQ-177(V) (PCDP) SM-D-912531	Replace Repair Test Repair		0.1 0.1	 0.3 1.8			28 28 1,4,5 17,18,19 1,3,4,17 18,19	
030201	Keyboard Panel SM-D-911149-1	Replace Test Repair			0.1		 0.3 0.5	3	 B B

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
030202	Bearing Indicator Driver-CCA A3005241	Replace Test Repair			0.1 0.1 0.4			3 5 3	
030203	Control Display Panel Assy SM-D-919488	Repair Replace Repair		0.1	0.3		0.5 0.9	28 3 2,3	A,K A,L
03020301	Display Readout-CCA SM-D-912921	Replace Repair					1.0 0.2	3,8 8	
03020302	Interconnection Board-CCA A3005251	Replace Repair					1.5 0.5	3,8 8	
030204	I/O Control-CCA A3005231	Replace Test Repair			0.1	 0.5L 0.8L		3 7 7	 M
030205	Data Readout and Entry Micro-processor-CCA A3005201	Replace Test Repair			0.1	 0.5L 0.8L		3 7 7	 M
030206	Data Readout Driver-CCA A3005191	Replace Test Repair			0.1	 0.5L 0.8L		3 7 7	 M
030207	Segment Driver-CCA A3005161	Replace Test Repair			0.1	 0.5L 0.8L		3 7 7	F M
0303	Airborne Installation Kit (Fixed Wing) A3004941	Repair		0.1					

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
030301	Voltage Regulator CN-1547/VSQ-177(V) (APA) SM-D-919491	Test Replace Test Repair		0.1 0.1		0.5L 1.6L		5 28 7 7	M
03030101	DC Converter-CCA SM-D-919511	Replace Repair				0.3L 0.8L		7 7	A
03030102	Power Conditioner-CCA SM-D-919501	Replace Repair				0.3L 0.8L		7 7	A
030302	Cable Assy, RF SM-C-911509	Replace Repair		0.1 0.3				28 5,28	
030303	Cable Assy, BDI A3004937	Replace Test Repair		0.1 0.3 0.4				28 5 3,10-14	
030304	Cable Assy, Power A3004930	Replace Test Repair		0.3 0.1 0.3				28 5 3,10,11, 15,16	
030305	Altimeter Pitot Hose SM-C-911520	Replace Repair		0.1 0.1				28 3	
030306	Cable Assy, Signal A3004929	Replace Test Repair		0.1 0.3 0.3				28 5 3,10,12-14	
030307	Resilient Mount MT-6143/ASQ-177(V) SM-D-912545	Replace Repair		0.3	0.1			28 2,3	

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
04	Auxiliary Ground Unit (AGU) AN/GRC-210	Inspect	0.1						
		Test	0.1						
		Repair	0.1						
		Test		0.2				1,4,5	
		Repair		0.7				3,5	
		Test			0.2			1,4,5	
		Aline			0.2			1,3,4	
		Adjust			0.2			1,2,3,4,	
		Install			0.5			3	
0401	Receiver-Transmitter RT-1343/TSQ-129 (BUU) SM-D-912601	Replace		0.1					D
0402	Control-Readout Unit C10830/PSQ-4 (URO) SM-D-912831	Replace		0.1					E
0403	Auxiliary Ground Unit Installation A3004981	Repair		0.1					
040301	Power Adapter Assy A3005151	Test		0.1				5	
		Replace		0.1					
		Repair		0.2				5	
04030101	Selectable Power Adapter (SPA) PP-7641/VSQ-1 SM-D-919521	Replace		0.1				5	H
040302	Battery Case Assy (BCA) CY-7872/GRC-210 A3004991	Test		0.1				5	
		Replace		0.1					
		Repair		0.1					
		Test			0.1			5	
		Repair			0.3			2,3,5	

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
04030201	Wiring Harness A3004906	Test Replace Repair			0.1 0.2 0.5			5 2,3 2,3,5	
04030202	Cable Assy, DC Power SM-C-911499	Replace Repair			0.1 0.3			 2,3,5	
04030203	Cable Assy, Antenna SM-C-911497	Replace Repair		0.1	 0.3			3 2,3,5	
04030204	Cable Assy, DC Power A3004939	Inspect Test Replace Repair		0.1 0.1 0.1	 0.4			 5 2,3,5	
04030205	Cable Assy, AC Power A3004938	Replace Repair		0.1	 0.4			 2,3,5	
05	Airborne Radio Set (Rotary Wing) AN/ASQ-177(V)2	Inspect Test Test Repair Test Adjust Aline	0.1 0.1	 0.2 1.4	 0.2 0.3 0.3			 1,4,5 28 1,4 1,2,3,4, 1,3,4	
0501	Receiver-Transmitter RT-1343/TSQ-129 (BUU) SM-D-919601	Replace		0.1				28	D
0502	Control Display Panel (PCDP) C10829/ ASQ-177(V) SM-D-912531	Replace		0.1				28	G

SECTION II MAINTENANCE ALLOCATION CHART FOR POSITION LOCATION REPORTING SYSTEM

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0503	Airborne Installation Kit (Rotary Wing) A3004961	Repair		0.1					
050301	Voltage Regulator CN-1547/ASQ-177(V) (Airborne Power Adapter) SM-D-919491	Replace		0.1				28	I
050302	Cable Assy, RF SM-C-911509	Replace Repair		0.1 0.3				28 5,28	
050303	Cable Assy, BDI A3004937	Replace Test Repair		0.1 0.3 0.4				28 5 3,10-14	
050304	Cable Assy, Power A3004930	Replace Test Repair		0.3 0.1 0.3				28 3,10,11 15,16	
050305	Altimeter Pitot Hose	Replace Repair		0.1 0.1				28 3	
050306	Cable Assy, Signal	Replace Test Repair		0.1 0.3 0.3				28 5 3,10-14	
050307	Resilient Mount Mt-6144/ ASQ-177(V) SM-D-912555	Replace Repair		0.2	0.1			28 2,3	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS FOR POSITION LOCATION REPORTING SYSTEM

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
01	O,F,D	PLRS TEST SET TS-4118/S	6625-01-186-9197	
02	F,L,D	TK-100/G	5180-00-605-0079	
03	F,L,D	TK-105/G	5180-00-610-8177	
04	O,F,D	KEYING DEVICE, KYK-13/TSEC	5810-01-026-9618	
05	O,F,L,D	DIGITAL MULTIMETER AN/PSM-45	6625-01-139-2512	
06	F,D	HEX HEAD SCREW KEY, 7/64	5120-00-889-2162	
07	L	TEST-REPAIR SYSTEM AN/MSM-105(V)1	6625-01-095-3737	
08	L	BENCH-TOP REPAIR SYSTEM, PRC-350C	6625-01-075-0261	
09	D	AN/USM-410(V)3	6625-01-077-5452	
10	O	TURRET HEAD ASSEMBLY	5120-00-016-7582	
11	O	CRIMPING TOOL	5120-00-165-3912	
12	O	EXTRACTION TOOL	5120-00-177-6966	
13	O	INSERTION TOOL	5120-00-177-6977	
14	O	CRIMPING TOOL	5120-00-278-2423	
15	O	INSERTION TOOL	5120-00-018-0529	
16	O	EXTRACTION TOOL	5120-00-409-5206	
17	F	RADIO INDICATOR	5826-00-897-4889	
18	F	SYNCHRONOUS TRANSMITTER	5990-00-811-9448	
19	F	POWER SUPPLY, +28 VDC, PP-1104C/G	6130-00-542-6385	
20	F	MAINTENANCE KIT, ELECTRONIC EQUIPMENT MK-693A	5821-00-045-9695	
21	F,D	CONTROL-READOUT UNIT C-10830/PSQ-4	7021-01-177-0789	
22	D	COMMUNICATIONS TERMINAL AN/UGC-74A(V)3	5815-01-062-8194	
23	D	AC POWER CABLE	5825-01-198-0528	
24	D	DIRECTIONAL COUPLER HEWLETT-PACKARD 778-D	5985-01-016-8863	
25	D	20 dB ATTENTUATOR, NARDA 766-20	5985-01-065-8081	
26	D	SELECTABLE POWER ADAPTER PP-7641/VSQ-1	6110-01-175-7312	
27	D	SPECTRUM ANALYZER AN/USM-489(V)1	6625-01-079-9495	
28	C,O	TK-101/G		

SECTION IV. REMARKS

Reference Code	Remarks
A	Tested during test of next higher assembly (NHA).
B	Vendor-repairable item.
C	COMSEC device that requires special handling.
D	The BUU is common to all configurations. See breakdown under group number 0101.
E	The URO is common to group numbers 01, 02, and 04. See breakdown under group number 0102.
F	There are two identical segment driver CCAs in the PCDP.
G	The PCDP is common to group numbers 03 and 05. See breakdown under group number 0302.
H	The SPA is common to group numbers 0203 and 040301. See breakdown under group number 020301.
I	The APA is common to group numbers 0303 and 0503. See breakdown under group number 030301.
J	Refer to KGV-6/TSEC Technical Manual MAM 502.
K	Limited to replacement of front panel and chassis mounted components.
L	Performed in conjunction with overhaul of next higher assembly.
M	Tested on automatic test equipment (ATE).

GLOSSARY

Term or Abbreviation	Definition or Description
AF	Airborne fixed wing unit
AG, AGU	Auxiliary ground unit
ANT	Antenna
APA	Airborne power adapter
AR	Airborne rotary wing unit
AVIM	Aviation intermediate maintenance
AVUM	Aviation unit maintenance
BAR	Barometric, barometer
BDI	Bearing deviation indicator
BRG	Bearing
BRT	Brightness
BTRY	Battery
BUU	Basic user unit
CG	Center of Gravity
CPSM	Continuous phase shift modulation
CV	Cryptovariable
FA	Process failure
I/O	Input/output
Keep-alive battery	A battery that supplies power to the cryptovariable memory circuits so that cryptovariables are not lost when BUU power is turned off.
LED	Light emitting diode
LIM	Limiter
MAC	Maintenance allocation chart
MP, MPU	Manpack unit
MSG	Message
MTOE	Modified Table of Organization and Equipment
NG	No good; faulty
OSC	Oscillator
PCDP	Pilot control display panel
PLRS	Position location reporting system
PROC	Processor
R VAR	Rekey variable
RCVD	Received
RPSTL	Repair Parts and Special Tools List
RNG	Range
SDU	Secure data unit
SPA	Selectable power adapter
Self-test	Programmed test functions of the BUU, URO, and PCDP that ensure proper operation of the user units.
SV, SVU	Surface vehicle unit
T VAR	Traffic variable
TOA	Time of arrival
TMDE	Test, Measurement, and Diagnostic Equipment
URO	User readout
UU	User unit
VAR	Cryptovariable

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